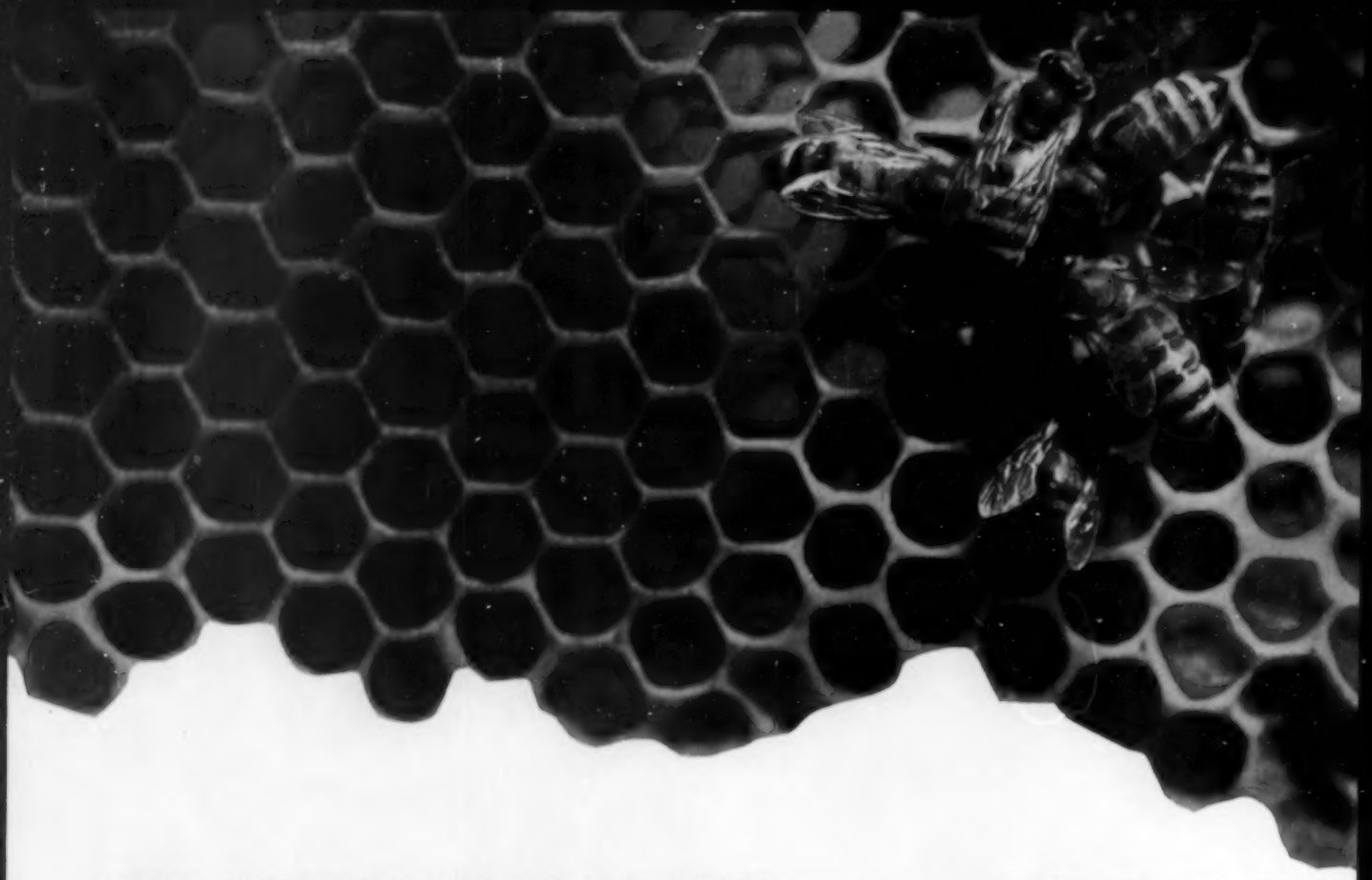
November, 1956

Vol. 45
No. 9

Industrial Arts and Vocational Education

The Shop Teachers' Professional Magazine



THE LESSON OF THE BEES

Credit: Harvey Croze, Bloomfield Hills, Mich.

Man's ingenuity goes far. A science instructor at a school in Michigan noted that bees use *part* of the nectar they gather from flowers *to build the honeycomb* . . . and only the rest for making honey. This science instructor proceeded to build a *plastic* honeycomb for his bees—and sure enough the bees used *all* their nectar *and all their time* for making honey.

Man's ingenuity goes far. It cannot *prefabricate* the foundation needed by any schoolboy on his way to manhood's career. But it certainly can greatly help the boy avoid the mistakes that would delay him, that might lay waste to many productive years, that could cause unhealable wounds, could warp his personality and pervert his aims. It can help him arrive at the productive and fruitful years that much sooner.

Such is the goal of modern education. And every educator worthy of the name uses all the ingenuity at his command to foster the traits in a boy that go to form the right foundation for all that follows. Where but in school is there greater opportunity to foster a keen sight for facts? Where is there better opportunity than in mechanical drafting to build the habit of application and persistence in a course of activity? And who has greater opportunity than the *instructor* in mechanical drafting to foster a love for fine work, for high craftsmanship, the ideals that give a boy his direction? And such an instructor will insist on the right start by insisting on the finest set of drawing instruments each student can afford.

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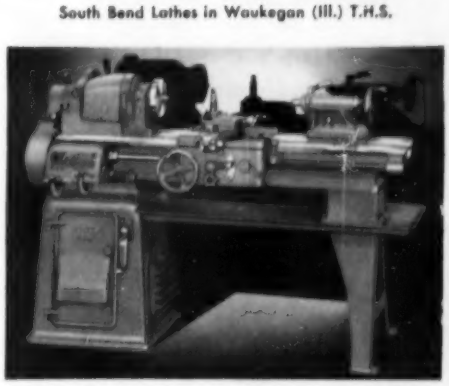

13" x 4' South Bend Engine Lathe (less chip pan and electrical equipment) f.o.b. factory..... $1533

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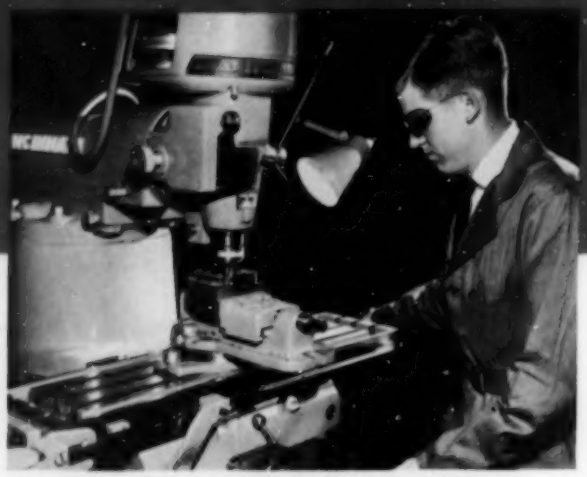

. . . and enable your students to become more familiar with many additional machining operations on CINCINNATI® Toolmaster Milling Machines. In the following list, you will find others just as useful for student training.

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- **6" extra table traverse**
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Two Toolmaster attachments are shown above:
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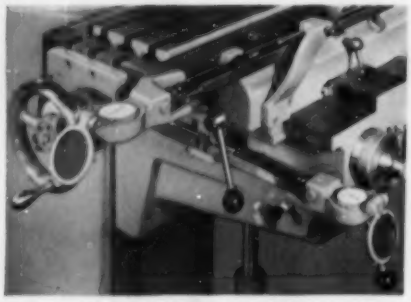
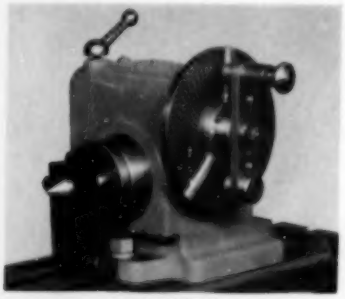


Precision Measuring Equipment



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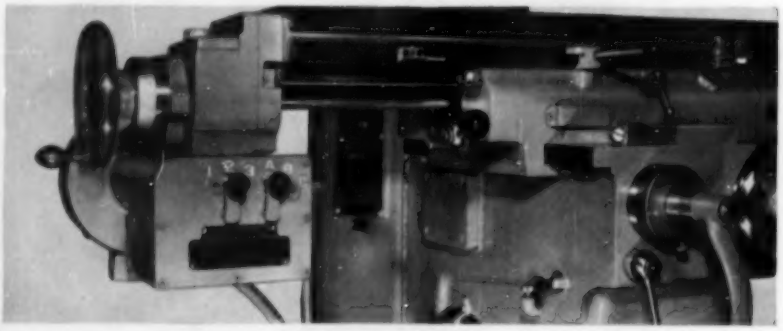
Shaping Attachment



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NOVEMBER
1956

VOL. 45 NO. 9

Industrial Arts and Vocational Education

The Shop Teachers' Professional Magazine

Published on the 15th of the month preceding the date of issue by THE BRUCE PUBLISHING CO., 400 North Broadway Milwaukee 1, Wis. • CENTRAL OFFICE: 20 North Wacker Drive, Chicago 6, Ill. • EASTERN OFFICE: 233 Broadway, New York 7, N. Y.

☆ ☆ ☆

This Month's Cover

The cover photo on this issue shows a student in the William L. Dickinson High School, Jersey City, N. J., using the 3-wire method for checking the accuracy of his thread cutting.

Photograph submitted by Harry J. Wilson, machine shop instructor.

☆ ☆ ☆

Entered January 2, 1914, as Second-Class Mail Matter at Milwaukee, Wis under Act of March 3, 1879. Copyright 1956, by the Bruce Publishing Co. Title registered as Trade Mark in U. S. Patent Office, November 25, 1930. Published monthly except during July and August.

Subscription Information. — Subscription price in the United States, U.S. possessions, and Canada, $3.75 a year, payable in advance. In all foreign countries, $4.25. Single copies 50 cents. March School Shop Annual, $1.00.

Discontinuance. — Notice of discontinuance of subscription must reach the Publication Office in Milwaukee, at least fifteen days before date of expiration. Notices of changes of address should invariably include the old as well as the new address. Complaints of non-receipt of subscribers' copies cannot be honored unless made within fifteen days after date of issue.

Editorial Contributions. — The Editor invites contributions bearing upon Industrial Arts, Vocational Education, and related subjects. Manuscripts, drawings, projects, news, etc., should be sent to the Publication Office in Milwaukee. Contributions are paid for upon publication. In all cases manuscripts should be accompanied by full return postage.

Articles Indexed. — The articles contained in the Magazine are regularly indexed in "The Readers' Guide to Periodical Literature," and "Education Index."

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Association News

COMING CONVENTIONS

Oct. 25–26. Minneapolis Vocational Association, at Leamington Hotel, Minneapolis, Minn. Secretary, Constance Malmsten, Technical High School, St. Cloud, Minn.

Nov. 1–2. Iowa Vocational Association, at Hotel Savery, Des Moines, Iowa. Secretary, M. Z. Hendron, State Office Building, Des Moines, Iowa.

Nov. 1–2. Wisconsin Industrial Arts Association, at Public Museum Auditorium, Milwaukee, Wis. Secretary, Leo R. Ebben, 519 Church St., Kohler, Wis.

Nov. 7–9. Missouri Vocational Association, at Municipal Auditorium, Kansas City, Mo. Secretary, H. H. London, University of Missouri, Columbia, Mo.

Nov. 8–10. Mississippi Valley Industrial Arts Conference, at La Salle Hotel, Chicago, Ill. Chairman, Dr. Verne C. Fryklund, president, Stout State College, Menomonie, Wis.

Nov. 10–12. Adult Education of the U.S.A., at Chalfonte-Haddon Hall Hotel, Atlantic City, N. J. Co-ordinator, Malcolm S. Knowles, 743 North Wabash, Chicago, Ill.

Dec. 3–7. American Vocational Association, at Kiel Auditorium, St. Louis, Mo. Secretary, M. D. Mobley, 1010 Vermont Ave., N.W., Washington 5, D. C.

SHELDON Precision LATHES
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Better SCHOOL LATHES
—for students
—for instructors

"Zero Precision" tapered roller bearings support the spindle, retain their accuracy, and eliminate costly bearing maintenance.

Modern Apron with new and improved friction disc type clutch for power feeds has a built-in safety interlock.

Quick Change gear box has wide number of pitches and feeds available, eliminates changes in end gearing, permits rapid selection of feeds while lathe is running.

OTHER QUALITY FEATURES INCLUDE: CARRIAGE, HEADSTOCK AND TAILSTOCK HAND-SCRAPED TO BED. LARGE MICROMETER DIALS. TAPERED TAKE-UP GIBS. DOUBLE NEOPRENE V-BELTS TO SPINDLE. HEAVY, RUGGED BED.

SHELDON PRECISION LATHES are standard in leading vocational schools and industrial arts shops. They are of modern industrial design — in weight, power, capacity, speed range, extreme accuracy, safety, ruggedness and long life. Hence they permit practical shop courses and worthwhile projects.

They accustom students to "big lathe" power and controls; to big lathe "feel" and performance, building student confidence satisfaction and skill. Still they are safer, with new safety switches, aluminum shear pins, safety color code, and all gearing, belts and drive pulleys completely enclosed.

They minimize supervision and work load requirements for instructors. They end laborious and costly maintenance. The large "Zero Precision" Taperer Roller Spindle Bearings hold their accuracy in spite of student abuse. Bearing maintenance is reduced to a fractional turn of a take-up collar after long hard usage.

Produced by modern methods in a specially equipped machine tool plant Sheldon Lathes are priced to school budgets.

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FIRST ANNUAL VACATION WORKSHOP

The first annual Minnesota Industrial Arts Vacation Workshop which was held at the State Educational Camp at Arrowhead Lake north of Virginia, on August 22, 23, and 24, 1956, was an outstanding success. Forty industrial-arts teachers from all parts of Minnesota participated.

The workshop was sponsored by the Birch Coulee Industrial Arts Club of the Minnesota Industrial Arts Association in co-operation with the Minnesota State Department of Education and the Bemidji State Teachers College.

The workshop faculty consisted of Dr. Robert A. Swanson, Stout State College, Menomie, Wis., who served as plastics instructor; Raymond Cherry, Lockport Township High School, Lockport, Ill., leatherwork instructor; and Lee Gresser, Osseo Public Schools, Osseo, Minn., Fiberglas instructor.

The general chairman of the workshop was Floyd Wurscher, industrial-arts instructor at Gaylord. Walter Remple, industrial-arts instructor at Springfield, served as co-chairman.

Robert M. Worthington of the Minnesota State Department of Education, served as workshop director, and Walter Klausler and Charles Shubat, of the State Department of Education, were workshop consultants.

Participants desiring to enroll for college credit were granted two regular college credits by the Bemidji State Teachers College.

PENNSYLVANIA INDUSTRIAL ARTS ASSOCIATION CONVENTION

The fourth annual meeting of the Pennsylvania Industrial Arts Association will be held at Hershey, Pa., on October 26 and 27, 1956. The theme of the conference will be "Serving Pennsylvania Through Industrial Arts Education."

The program as prepared under the direction of Earl T. Kuhn, president, offers a variety of interesting speakers and worthwhile subjects.

Roy A. Radtke, president of the American Industrial Arts Association, and director of industrial arts at Milwaukee, Wis., public schools, will address the banquet meeting.

In addition to the general sessions there will be conducted tours through several leading industries and through several high schools in the area, and commercial exhibits.

The Epsilon Pi Tau breakfast will be held on Saturday in the dining room, Hershey Community Inn, at 7:30 a.m.

SAFETY EDUCATION PROGRAM

The National Safety Congress, at the Morrison Hotel, Chicago, Ill., on October 23, will have a session on "Safety in the Practical Arts," sponsored by the American Vocational Association-National Safety Council Joint Safety Committee.

The discussion leader will be Dr. M. D. Mobley, executive secretary, American Vocational Association, Washington, D. C.

Russell H. Landis, professor of industrial arts education, Eastern Illinois State Teachers College, Charleston, Ill., will be the recorder.

The following named will act as resource people: Ellery H. Frost, R. F. Espenschied, Nicholas P. Stumpf, Opal Galloway, Hilda Geuther, Edward S. Adams, Charles J. Kraft, Jr., A. D. Florence, Allen L. Cobb, Charles S.

(Continued on page 6A)

SKIL ¾ H.P. MODEL 297

- **23,000** r.p.m.
- **All precision ball bearings**
- **6½" high, overall**
- **Net weight, only 5¾ lbs.**

NEW-DESIGN SKIL HINGE-BUTT TEMPLATE KIT

Timesaving, worksaving new hinge-butt template kit brings new speed and simplicity to door and jamb mortising when used with Model 297. Eliminates measuring, complicated calculations and layout! Jamb pins automatically position templates . . . no nailing of temporary door stops before routing.

Right from the start, the vocational student needs a full opportunity to develop—such as only famous-quality SKIL Tools can give him.

Superior performance, simple operation and ease of handling make SKIL Tools the favorites of beginners as well as professionals. They're rugged and last longer than ordinary tools. They also save time and money when used for school maintenance and repairs.

LIGHTWEIGHT, EASY-HANDLING, SMOOTH-CUTTING SKIL ROUTER

This Model 297 Router delivers more than enough power for grooving in shelves, routing out counters, dadoing, beading, rabbeting, mortising, veining, and cove cutting . . . handles a wide range of decorative cutting jobs with speed and precision. Check these exclusive SKIL Router features. Let this new SKIL Tool help give your students the best possible start!

- **Super-powered motor** maintains highest working speed for smoothest cutting under all conditions.
- **Exclusive type spindle lock** located on collet chuck for greatest convenience. Requires only one wrench for bit changing!
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- **Tough plastic sub-base** of "high-impact" polystyrene. Protects surfaces from marring.

See Your SKIL Distributor For Complete Information on Model 297 Router, or Call Your Nearby SKIL Factory Branch. **SKIL Portable Tools include Saws, Planes, Drills, Drivers, Belt Sanders, Disc Sanders, Grinders and SKIL Radial Saws.**

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SKIL PORTABLE TOOLS

ASSOCIATION NEWS

(Continued from page 4A)

Rust, George D. Grist, Sally Crow, Rosemary Leenerts, Jerry Anderson, Harry L. Sweet, and Jack Lain.

INDUSTRIAL-ARTS MEETING

The Delaware State Industrial Arts Association is planning a two-day program, in conjunction with the State Teachers Convention, to be held October 25 and 26.

The Association will be the guests of the Holloway Brothers Tool Company of Wilmington at a luncheon and display and demonstration of power tools on October 25.

At the sectional meeting on October 26, Dr. Stanley J. Pawelek, supervisor of industrial arts, Baltimore, Md., will speak on "Trends and Problems in Industrial Arts."

Officers elected for the coming year are president — Harry R. Bock, Alfred I. DuPont Junior High School, Wilmington; vice-president — Clifton Jones, Wilmington High School; and secretary-treasurer — Herbert Hurst, Mt. Pleasant High School, Wilmington.

NEW OFFICERS NAMED

The Fairfield County (Conn.) Industrial Arts Association have elected the following officers for 1956–57: president, Ralph Killelea, Warren Harding High School, Bridgeport, Conn.; vice-president, Maurice Lauridsen, Eastern Junior High School, Greenwich, Conn.; secretary, John J. Burkhart, Stamford High School, Stamford, Conn.; treasurer, Henry Palmer, Center Junior High School, Norwalk, Conn.; state representatives, Byron A. Berry and Carl E. Matson; and chairman of membership committee, Ernest Bono.

The program of meetings for the school year include the following dates: September 26, at New Andrew Warde High School, Fairfield; November 28, at remodeled Burdick Junior High School, Stamford; February 13, at Staples High School, Westport; and April 10, at Elks Club, West Haven. This will be a joint meeting of Fairfield and New Haven County Industrial Arts Associations. — *John J. Burkhardt.*

INDUSTRIAL-ARTS CONFERENCE

The 43rd Mississippi Valley Industrial Arts Conference will be held in Chicago, Ill., on November 8, 9, and 10, 1956. Headquarters for the meetings will be the Hotel LaSalle.

The general chairman for the meeting is Dr. Verne C. Fryklund, president, Stout State College, Menomonie, Wis.

The three-day program will feature a variety of interesting speakers covering topics of significance and importance.

FOURTH ANNUAL MEETING

The National Association of Public School Adult Educators will hold its fourth annual conference at the Haddon Hall Hotel in Atlantic City, N. J., on November 7, 8, and 9, 1956.

The theme of the convention is "How Can We Build Better Programs for the Adults in our Communities," and will be analyzed from two points of view, i.e., (1) the professional concerns of the public school adult educator, and (2) his administrative responsibility toward meeting the needs of the people.

Robert A. Luke, executive secretary of NAPSAE, will spell out the organizational concerns of the group.

Dr. Ralph E. Crow, president, will introduce the keynote speaker, Dr. Frederick E. Raubinger, New Jersey State Commissioner of Education on Friday evening. Dr. Everett C. Preston, chairman of this convention, and director of the Division of Adult Education for New Jersey, will be installed as the new president of NAPSAE.

The NAPSAE organization has been planning closely with the Adult Education Association of the U. S. A., whose meetings will follow at the same location for the next three days.

Early reservations are advised.

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THE BEST BIT BRACE
for
school shop use?
You'll find the answer — according to thousands of school shop instructors — in the famous Millers Falls line.
Possibly you'll prefer the No. 772, an outstanding favorite with generations of expert craftsmen... or the No. 1950 with its unbreakable "Tenite" head and handle... or any one of the other popular models. There are Millers Falls bit braces in every price range.
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Personal News

GRONEMAN RECEIVES APPOINTMENT

The permanent appointment of Dr. Chris H. Groneman to the position of co-ordinator for the Texas A. & M. College's Council on Teacher Education, effective September 1, has been announced recently by President David H. Morgan.

Before this Dr. Groneman has been serving as chairman of the Teacher Education Council. The action announced means that his title is changed from Chairman to Co-ordinator, and that instead of serving for a specified term, he will have a permanent appointment.

Dr. Groneman is also head of the industrial education department, and chairman of the athletic council.

Council Advises on Teacher Education

The Council on Teacher Education serves as an advisory group on the operation of all

(Continued on page 25A)

two new

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NEW DELTA 15"—World's most versatile drill press for student instruction—extra safe for student operation!

DOES MORE JOBS MORE ACCURATELY—Really *practical* for teaching because it does so many jobs so well. *Only* Delta gives you a selection of *six* spindle adaptors—mounted on a ground taper for complete accuracy, featuring a threaded collar for *positive* locking.

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BUILT TO LAST—Spindle has four over-sized, preloaded, lubricated-for-life ball bearings for *extra* ruggedness. Big 2" dia. quill and massive one-piece head casting provide greater rigidity.

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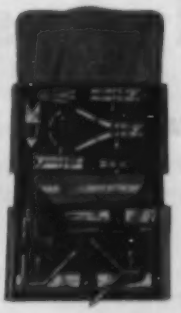

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NO. 22C 59 DEGREE DRILL POINT GAGE
Measures drill lip lengths and insures correct 59° point angles for best cutting. Also serves as plain rule, hook rule, depth gage, try square and slide caliper.

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No. 11 Combination Square, 12 inch
No. 1010 Dial Indicator Pocket Gage
No. 815 Toolmakers' Hammer
No. 86A Combination Hand Vise
No. 596 Pencil Divider
No. 54 Hold Downs
No. 196A Universal Dial Test Indicator
No. 29 Scratch Gage
No. 56A Toolmakers' Surface Gage
No. 172A Thickness Gage
No. 70A Pocket Scribers
No. 500 Steel Pocket Tape, 72 inch
No. 530 Steel Case Tape
No. 711F "Last Word" Dial Test Indicator
No. 50A Improved Trammels
No. 93A T-Handle Tap Wrench
No. 132 Bench Level, six inch
No. 129 Bench Block
No. 236H Depth and Angle Gage
No. 135 Pocket Level
No. 165 Double End Pin Vises
No. 166 Pin Vises
No. 579 Telescoping Gages
No. 185 Tap and Drill Gage
No. 187 Jobbers' Drill Gage
No. 167 Radius Gages
No. 829 Small Hole Gages
No. 555 Jewelers' Screw Drivers
No. 6 Screw Pitch Gage
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Adjustable for 8, 10 or 12-inch blades. Sturdy satin finish frame with tough rubber pistol grip. An ideal frame for use with Starrett hand hacksaw blades.

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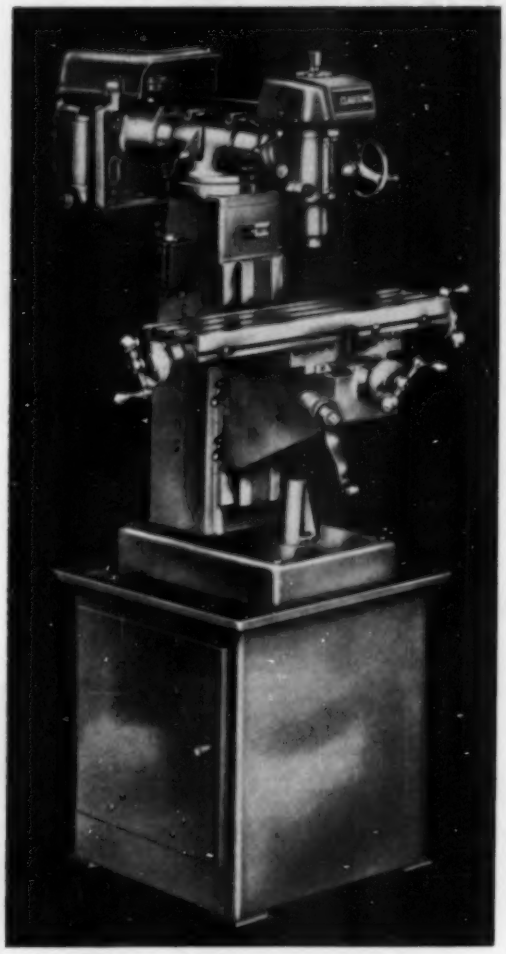
HAND MEASURING TOOLS AND PRECISION INSTRUMENTS
DIAL INDICATORS • STEEL TAPES • PRECISION GROUND FLAT STOCK
HACKSAWS • HOLE SAWS • BAND SAWS • BAND KNIVES

CLAUSING VERTICAL MILL

A RUGGED, VERSATILE MACHINE TOOL



INDISPENSABLE FOR MODERN SCHOOL SHOP TRAINING

You need this rugged, versatile CLAUSING VERTICAL MILL to teach *more* basic operations *better!* It's a machine that most industries now use for operations requiring exceptional sensitivity and accuracy. And this CLAUSING MILL will stand up under severest usage, no matter how inexperienced the operator. Amazingly versatile . . . spindle head can be swiveled in vertical plane, and set at any angle, and turret rotated in a horizontal plane, making it possible to mill, drill, bore, ream, and shape at all angles with one set-up. It is actually *several* precision machines in one. Saving in set-up time alone is an important factor for both teacher and student. Built to rigid tolerances for efficient operation, sustained accuracy, and long service life. 7 ball bearings in the CLAUSING heavy-duty drive. All feed screws have ground threads, turn on ball bearings. Table surfaces and dovetail ways on table, saddle, knee and column are precision ground.

MILLS, DRILLS, BORES, REAMS & SHAPES with Extreme Accuracy . . . at all angles . . . with one work set-up

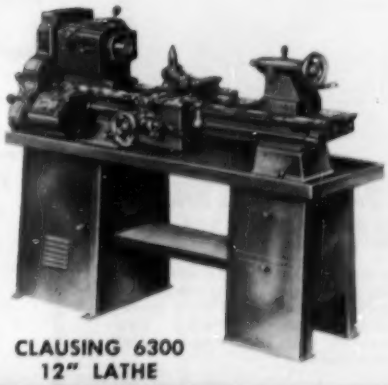
Any number of advanced operations can be taught easily and quickly on this versatile multi-purpose machine. Your CLAUSING dealer will gladly show you this unusual machine and demonstrate its many desirable features. See him before you purchase any new equipment . . . mills, drills, or lathes.

Safety Sam Says:

Write for free Safety Sam posters, wall charts, specification sheets and FREE LITERATURE.

SCHOOL SHOP PLANNING GUIDE - 50¢

(65c outside U.S.A.)



CLAUSING 6300 12" LATHE

CLAUSING 18" DRILL PRESS

CLAUSING DIVISION

Atlas Press Company

Quality Machine Tools Since 1911

11-121 N. Pitcher St. • KALAMAZOO, MICH.

Snap-on FLEX-HEAD WRENCHES —

SLIP into tight spots — PIVOT for action

FH-607-K
FLEX-HEAD SET

EACH socket of a *Snap-on* Flex-Head pivots through an arc of over 180 degrees — making it a handy wrench for reaching universal flange bolts, pan cap screws and similar jobs. The wrench swings over and under obstructions — handles hard-to-get-at nuts, studs, bolts. A friction spring holds the desired socket angle. With the handle in a vertical position, the nut can be spun rapidly. Flex the handle over and you have maximum leverage for tightening or breaking loose.

The *Snap-on* set illustrated provides all wrench sizes from 3/8 in. to 7/8 in., with the most widely used sizes duplicated on different handles.

Write for general catalog "V" listing 4,000 *Snap-on* hand and bench tools.

*Snap-on is the trademark of Snap-on Tools Corporation.

SNAP-ON TOOLS CORPORATION
8074-K 28th Avenue • Kenosha, Wisconsin

KALAMAZOO

METAL CUTTING BAND SAW

MODEL 8C
CUTS 8" ROUND,
14" FLAT STOCK,
8" PIPE

Good tools make teaching good workmanship easier. That's why most leading schools use *Kalamazoo* Metal Cutting Band Saws. Specify *Kalamazoo* for accuracy and safety. Four models, available with casters and coolant. Get full details *now*.

MACHINE TOOL DIVISION

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1156 Harrison Street Kalamazoo, Mich.

For Top Quality Lumber and Plywood

Order from

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Send today for free catalog

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Logan

- 12" SWING
- 1" COLLET CAPACITY
- 1⅝" SPINDLE BORE
- 25" and 35" CENTERS
- VARIABLE SPEED OR DOUBLE V-BELT DRIVE

GIVES SCHOOL SHOPS ACCURACY, CAPACITY AND POWER

This 12" swing lathe typifies Logan advanced design and rugged construction. Gears are extra wide and strong. Shafts are extra heavy. The lead screw has a full ⅞" diameter. The precision carriage rides on a two-V-way, two-flat-way bed that is rugged, precision ground and warp-free. The heavy spindle turns on oversize ball bearings, no bearing adjustment needed for any speed between 38 and 1575 rpm. This lathe, and every Logan Lathe from 14" swing down to 9" swing, is dynamically balanced before it is shipped. The result is *sustained accuracy* and smooth, quiet power on every lathe turning operation. See your Logan Lathe dealer for more facts—or mail us the coupon below.

No. 2557-V
12" Swing,
Variable Speed Drive
35" Centers

THIS COUPON
will bring you full details on Logan Lathe construction and specifications.

LOGAN ENGINEERING CO.
4901 West Lawrence Avenue, Chicago 30, Ill.

Send me full facts on the Logan line.

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IDEAL SHOP UNIT
keeps bits readily at hand

13 "GREENLEE 22" SOLID-CENTER AUGER BITS IN METAL HOLDING PANEL

Here's the handy, complete auger bit set designed especially for shops. Provides a practical assortment of bits and keeps them in order for you.

Panel has a holder for each bit with size clearly marked. Makes it easy for students and other workers to select the bits they need . . . *then return them to their places* so the next user knows where to find them!

Set includes 13 famous "GREENLEE 22" Solid-Center Auger Bits in sizes 4/16" to 16/16". These bits bore smoothly, accurately and have solid-center design which gives extra strength and provides positive, fast chip clearance. All are "Induction Heat-Treated" for uniformity, long life.

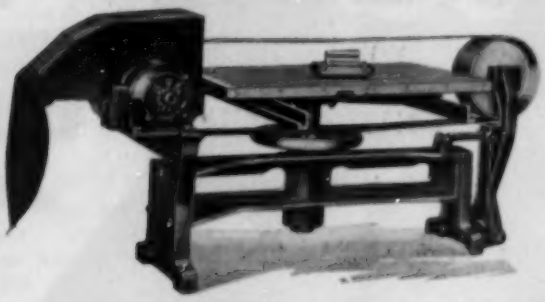
Solidly built metal holding panel has a sturdy metal easel and two knockout holes at top so that it may either be used standing up on a workbench or hung on the shop wall. Equip your shop with this handy, high-quality GREENLEE unit. At leading hardware and building supply dealers.

Write for free Catalog 35-H with information on the complete line of high-quality hand tools.

GREENLEE

GREENLEE TOOL CO., 2031 Twelfth St., ROCKFORD, ILLINOIS

That superb finish calls for this OLIVER Sander



A lost-cost Sander that produces smoothest work

To give your students the right training, the compact Oliver No. 298 Belt Sander is ideal. It takes little floor space. Sands stock up to 58" long, 26" wide at one setting, and up to 9" high. Dust hood and bag keep both floor and work clean. Built to give years of service. Write for Bulletin No. 298.

OLIVER MACHINES FOR SCHOOL SHOPS

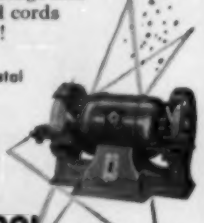
Bands Saws	Jointers	Tenoner	Shapers
Boring Machines	Jig Saws	Surfacers	Speed Lathes
Circular Saws	Mortisers	Sanders	Spinning Lathes
Tool Grinders			Wood Trimmers

Write for Bulletins

OLIVER MACHINERY COMPANY
Established 1890 GRAND RAPIDS 2, MICHIGAN

RUGGED! ECONOMICAL!

A Queen City pedestal or bench Grinder is a wise choice for the school shop. It has the features and performance of industrial grinders: repulsion-induction motor, fully enclosed; rugged bearings and guards; high quality switches and cords . . . yet the price is 20 to 30% less!



Queen City's new ¾ H.P. Bench or Pedestal combination Grinder and Buffer fits all school shop requirements perfectly. Find out why Queen City Grinders have been used in vocational training for over 30 years. Available from ½ H.P. on up.

QUEEN CITY MACHINE TOOL COMPANY
3916 Kellogg Avenue Cincinnati 26, Ohio

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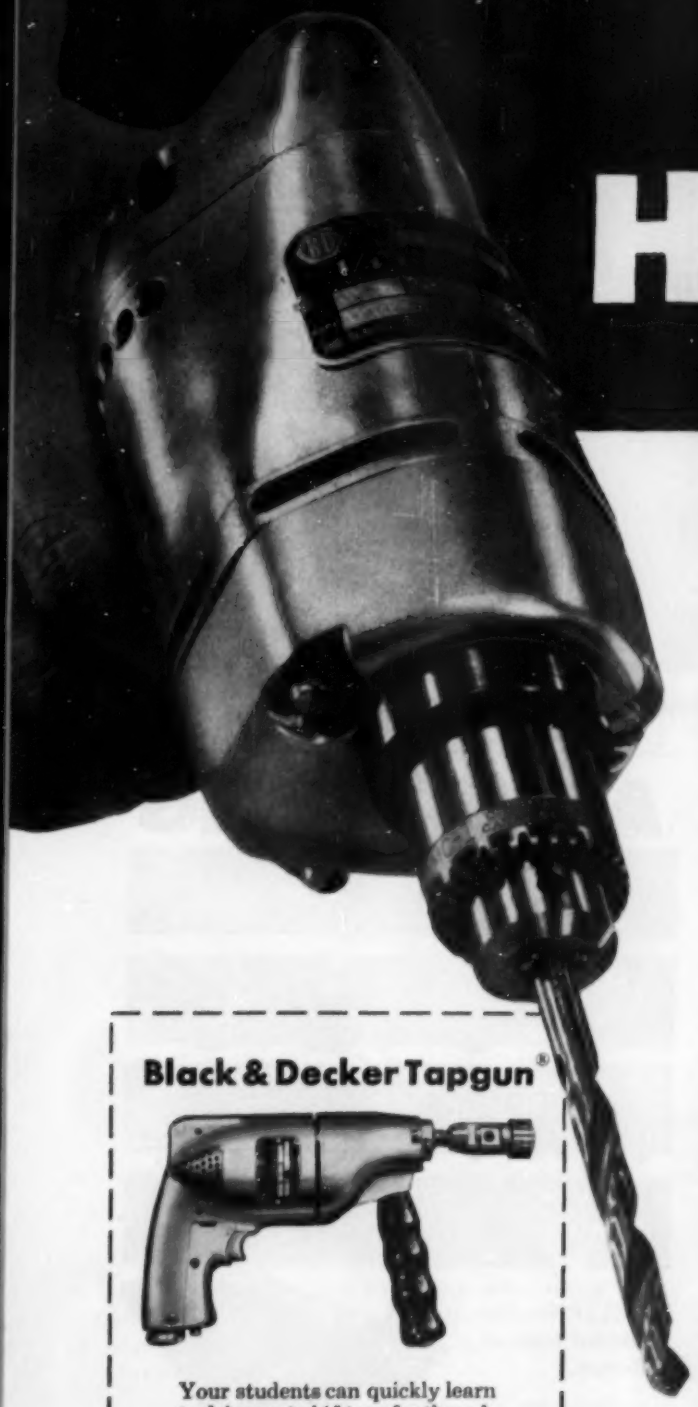
Handling's easier, learning's faster

with the Black & Decker
¼" Standard

HOLGUN®

(CODE NO. 345)



1. **Lowest-priced drill in its class!**
2. **Wear-resisting ball bearings.**
3. **Compact and lightweight—reduces operator fatigue.**
4. **No stalling under heavy loads.**
5. **Belongs to world's best-known drill line.**

The lightweight Black & Decker ¼" Standard Holgun's ease of handling reduces time required for learning to drill expertly. And it also speeds up training on jobs in which drilling plays a part.

What's more, students become familiar with the tool many will be using in industry, after graduation. Powered by a B&D-built motor, the Black & Decker ¼" Standard Holgun has stamina to spare for any job in your shop. Its rugged construction gives you years of trouble-free performance.

See your B&D distributor today or write: THE BLACK & DECKER MFG. CO., Dept. 2111, Towson 4, Maryland.

Black & Decker Tapgun®

Your students can quickly learn to drive up to ¼" taps for threading holes in steel, cast iron, brass and aluminum. The B&D Tapgun is lightweight, easy to handle—and *the only tool of its type!* Its automatic reversing mechanism eliminates the need for reversing switch!

Look in the Yellow Pages under "Tools-Electric" for Nearest Distributor

B&D **Black & Decker®**

Portable electric tools . . . *power-built* to last!

PARKS PLANERS Give Your Students Practical Experience on Popular Industrial Machines

Students learning on Parks Planers benefit not only from the safe, easy, and accurate operation of these planers, but also from the practical experience of working on the same type of high-speed, precision built planers they will eventually use in their trade. The Parks No. 20, 20" Planer (at right) has a 4-knife cutter-head with a speed of 3600 R. P. M. and offers two feed speeds—20 and 40 F. P. M. or 40 and 80 F. P. M. Available with knife-grinding attachment at additional cost.

THE **PARKS** No. 20
20" Thickness PLANER
WITH KNIFE-GRINDING ATTACHMENT

THE **PARKS** HEAVY-DUTY
12" Thickness PLANER

At left is the Parks Heavy-Duty 12" x 4" Planer—a compact, sturdy thickness planer with feed speed of 16 F. P. M. at 4000 R. P. M. Will handle material as short as 6" and as thin as 1/8". Both planers are priced low enough for even the most modest shop budget.
WRITE FOR COMPLETE DESCRIPTIVE LITERATURE.

THE **PARKS** WOODWORKING MACHINE CO., Dept. 24 1546 Knowlton St., Cincinnati, Ohio

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Now - LABORATORY FURNITURE by TOLCO

Laboratory Furniture is the newest addition to the TOLCO line of fine school equipment. Your Chemistry, Physics, Biology or General Science laboratories can now be equipped with Tolco furniture. You can save the expense of custom engineering and factory installation charges. It will pay you and your school to investigate.
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ARMSTRONG

Teach with the standard tools of industry.

Write for Catalog

ARMSTRONG BROS. TOOL CO.
"The Tool Holder People"
5222 W. Armstrong Ave. Chicago 30, U. S. A.
New York, San Francisco

NEW! Sheldon VISE

for both WOODWORKING AND METALWORKING

WOODWORKING

In this position hardwood-lined jaws of the new Sheldon All-Purpose Vise are flush with bench top for all phases of woodworking. Jaws are 7" wide and open 6½". Holes in jaw and bench top take dowel dogs for clamping large work.

RELEASE LEVER AND ROTATE VISE HALF-TURN TO LOCK —

METALWORKING

Metalworking jaws clear bench top by 3½". They have 3" wide by 1" high hardened, removable faces especially milled to grip pipe. Vise is engineered so that when metalworking jaws are closed the woodworking jaws remain open to prevent damage to hardwood liners.

Here at last is the ideal vise for the school shop. It was developed especially for the new Sheldon Industrial Arts Work Center illustrated at right, but it can be used on any bench for all clamping operations in woodworking and metalworking, including arts and crafts. It takes just a second for the student to convert the vise from wood operation to metal. Unbreakable malleable iron parts, enclosed oversize screw and nut, together with a sturdy hardwood handle provide the usual fine quality found in Sheldon school furniture and vises for more than 50 years.

Your Sheldon representative has more information on this vise for you. *Call him or write Sheldon for his name.*

E. H. Sheldon
EQUIPMENT CO.
MUSKEGON, MICHIGAN

THE RIGHT START
for a
SUCCESSFUL CAREER

The most practical approach to sound vocational instruction is to supply students with the same tools they will later use *out on the job*. That's why *so many* instructors always specify WESTON instruments. They know that *these* are the instruments students will encounter and use all during their industrial careers. All instruments, from simple galvanometers to precise laboratory standards are illustrated and described in bulletin form. Send for copies today. Weston Electrical Instrument Corporation, Newark 5, New Jersey. A subsidiary of Daystrom, Inc.

Miniature Clamp Volt-Ammeter
(Model 749)
Employs rugged, shock-mounted self-shielded mechanism, shatterproof plastic window. Ideal for school use. Adapter available for current measurement of motors and appliances. One scale for all ranges and functions. Low cost.

All-purpose ANALYZER
(Model 980)
A versatile, rugged VOM with a broad combination of ranges to measure Ohms, d-c current and volts, a-c volts. D-C sensitivity 20,000 ohms/volt. Single switch for all ranges and functions. Extremely compact, rugged, low cost.

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INSTRUMENTS

SAFE, DEPENDABLE
WOODWORKING MACHINES
For the School Shop
HAND JOINTER—compact and accessible. Built in 8" and 12" width. Table 6'2" long, maximum rabbet depth 9/16". Round, 3 knife safety type cylinder head, 3 HP 3600 RPM motor.
NO. 2 SURFACER—new, streamlined machine. Features simplified, mechanical design. Takes material 18" wide and from ⅛" to 8" thick.
NO. 4 VARIETY SAW—for variety sawing in any shop! Standard table 44" long and 36" wide, plus 19½" extension for carrying rip gauge table.
BAND SAWS—machine 20" diameter wheel illustrated. Floor space 24" x 36", horizontal capacity 20", vertical capacity under guide 11". Also 27" 32", and 36" machines available.
SHAPER—1" diameter spindle, with 4½" vertical adjustment, 36" x 26" table, spindle speed—8,500 RPM, floor space—34"x37".
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FOUNDRY & MACHINE CO.
NORTHFIELD, MINNESOTA, U. S. A.
Catalog

for effective instruction in ELECTRONICS
use ALLIED'S famous knight-kits
TYPICAL KIT VALUES
USED BY HUNDREDS OF SCHOOLS
10-in-1 Radio Lab Knight-Kit
Instructive, practical, fascinating. Builds any one of 10 projects: broadcast receiver, amplifier, wireless phono oscillator, home "broadcaster," code practice oscillator, relay, signal tracer, electronic timer, electronic switch, photo relay. Just change wiring for each project. With all parts, tubes and instruction manual. Shpg. wt., 10 lbs.
Model 83 Y 265. Only $12.65
Prices Net F. O. B. Chicago
"Ranger II" AC-DC Radio Knight-Kit
Popular 5-tube superhet radio project kit. Thousands now used in shop training; teaches practical radio construction. It's a commercial quality broadcast receiver when completed. Kit includes tubes, preformed chassis, speaker, loop antenna, all required parts, hardware, and easy-to-follow instructions. Shpg. wt., 8 lbs.
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See our Catalog for dozens of other fine Knight-Kits, including test instruments, amplifiers, student projects, etc.
FREE 356-PAGE ELECTRONIC SUPPLY GUIDE
Send for the 1957 ALLIED Catalog, the leading buying guide to everything in electronics for the school. Features the world's largest stocks of Training Kits, Sound and Recording equipment, Lab instruments, Tools, Books, Electronic parts, etc. Write for FREE copy today.
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Specialists in Electronic Supply for Schools

STANLEY SHOP TALK

New! Film strips on Chisels for woodworking

Another new visual aid series from Stanley Tools. This set helps teach the proper use of wood chisels.
Nine strips of 35 mm safety film in individual cans with a manual of suggested questions for testing.

FRAMES		FRAMES	
16	Types of Chisels	24	How A Chisel Cuts Mortise and Tenon Joints and Dovetail Joints
20	How A Chisel Cuts	16	How To Grind Chisels
18	How A Chisel Cuts Notches, Gains, Rabbets, Dados	10	How To Whet Chisels
10	How A Chisel Cuts Half Lap Joints	14	Special Chisels and Gouges
		11	How To Grind And Whet Gouges

$5.00 per set, packed in a handy box, postpaid, with a booklet of suggested test questions. Use the coupon.

NEW! SCREW-MATE

Stanley No. 1525 Drill-Countersink

This new Screw-Mate does 4 jobs at once—drills pilot hole and shank clearance, countersinks, and always stops at exactly the right screw depth. Fits chuck of hand drill, power drill or drill press. 24 sizes—from ½" x No. 5 through 2½" x No. 12. ¼" shank size.

No. 1525

ELECTRIC DRILL

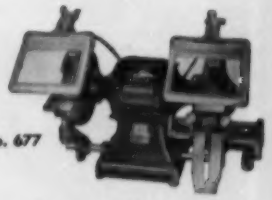
The Stanley No. 236. A fistful of power . . . another "Mighty Midget." This ¼" drill has 800 rpm full load speed, full ball bearing . . . 4 other ¼" models at higher speeds. STANLEY Nos. 237 and 238 are ⅜" capacity models at 575 and 375 rpm full load speeds.

No. 236

NEW! STEEL HAMMER— STANLEY STEELMASTER

The finest hammer ever made! Tubular steel handle that will not break . . . has shock absorbent neoprene grip. Rim of face is induction coil tempered . . . an important safety feature that minimizes chipping. Perfectly balanced. Available now in 13, 16 and 20 oz. curved claw models, and 16 and 20 oz. ripping claw models.

BENCH GRINDER



No. 677

Especially designed for the school shop. The grinding attachment is for all chisels and plane irons up to 2⅝" wide. Equipped with "Flud-Lite" Eye Shields that cannot be moved to non-guarding position.

Use this coupon for more detailed information and school shop help

STANLEY

Educational Dept., Stanley Tools, 47N Elm St., New Britain, Conn.

FREE ( ) Please send me Stanley Tool Catalog No. 34.
FREE ( ) Please send me the Stanley Electric Tool Catalog.
( ) Please send me one set of 9 Film Strips on chisels at $5.00 per set, postpaid.

NAME_____

SUBJECT YOU TEACH or POSITION_____

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the POWER TOOLS you wanted!

New heavy duty cabinet models . . . by DURO

You'll be creating confidence and building enthusiasm in your workshop work when your students train on DURO POWER TOOLS. This new line has been developed to meet your specific requirements for quality, utility, safety and price. Duro power tools are years ahead in design, ruggedly built to provide a lifetime of faultless service and they incorporate the priceless safety features you must have (with moving parts protected). Students operating Duro units are learning on equipment industry prefers too — tools that are rapidly becoming the "accepted standard" on wood and metal working jobs.

Send for FREE Power Tool Catalog and Shop Planning Guide

See firsthand how Duro power tools will fit your shop and budget. There are many units to choose from including circular, band and scroll saws, lathes, jointers, drill presses, disc and belt sanders, etc. The Duro planning guide will give you a clear insight into proper shop planning. Write today . . . both are free.

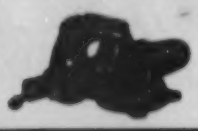
DURO METAL PRODUCTS CO.

2692 N. Kildare Avenue Chicago 39, Illinois

Reminder to Specify WILTON!

The light, solid aluminum handles used on Wilton Woodworkers' Vises end finger injuries and reduce noise in woodworking shops. They have tamperproof end pieces, too!! An exclusive Wilton feature, these aluminum handles **cost no more than wood or steel,** and are only one of many extra values found in all 16 models of continuous and rapid acting Wilton Woodworkers' Vises.

WRITE TODAY FOR CATALOG OF COMPLETE WILTON LINE!



WILTON
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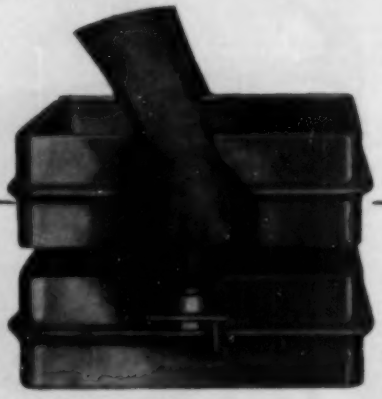

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You'll find Sterling Style "E" Flasks exceptionally easy to handle because pin lugs are combined with handles. In many foundries, these Style "E" Flasks have replaced snap flasks. They prevent runt outs . . . require less sand. Sterling Steel Flasks combine maximum strength with minimum weight. They retain their rigidity and accuracy, year-in, year-out. Write for Sterling Catal g.

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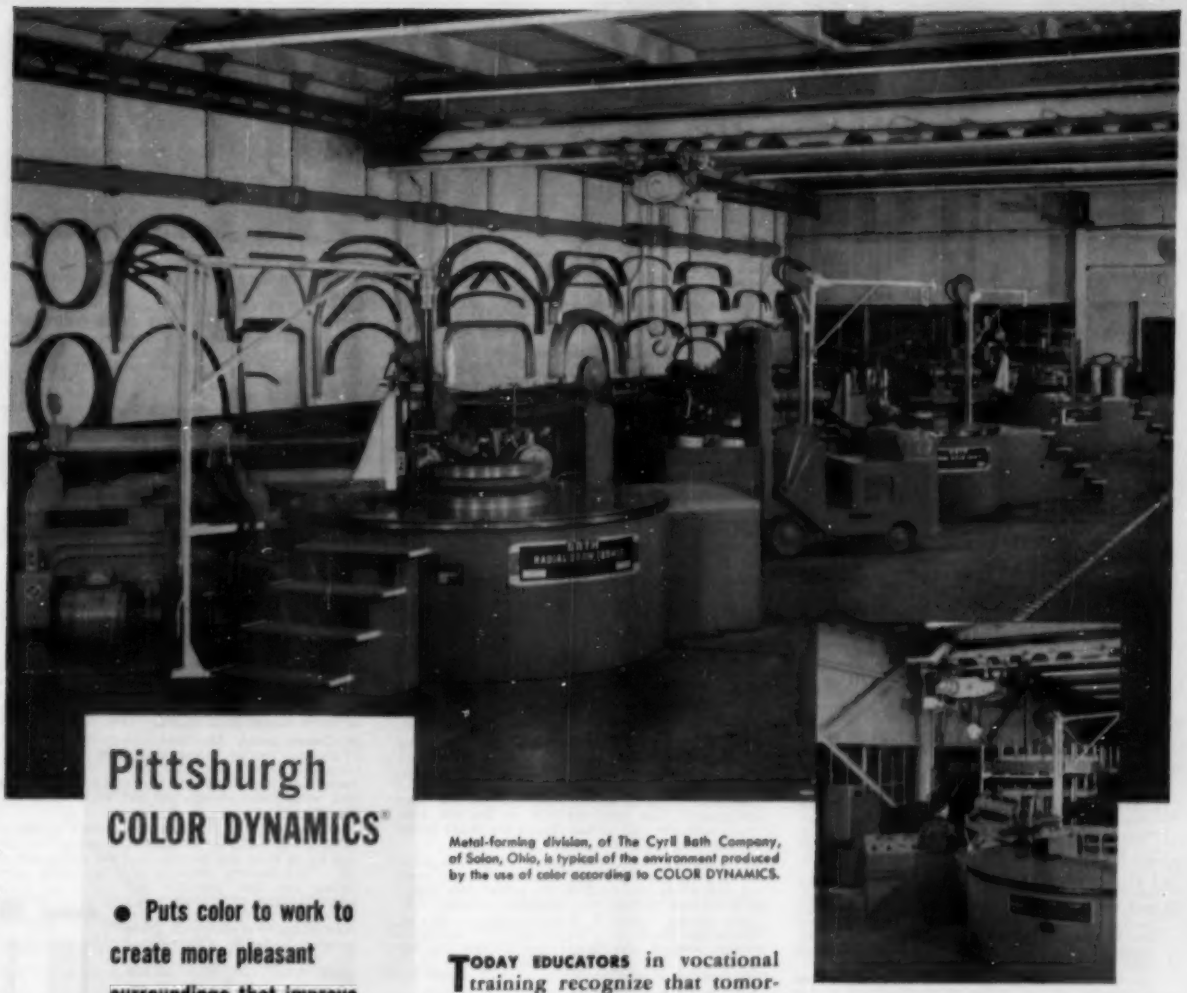


Pittsburgh COLOR DYNAMICS®

● Puts color to work to create more pleasant surroundings that improve productive efficiency and morale in modern plant where heavy metal-forming machinery is built!

THE CYRIL BATH COMPANY

Metal-forming division, of The Cyril Bath Company, of Solon, Ohio, is typical of the environment produced by the use of color according to COLOR DYNAMICS.

TODAY EDUCATORS in vocational training recognize that tomorrow's skilled shopmen must have more than a knowledge of machines, methods and metals. They must also know how to put color to work in the plant or the office to turn out more and better work.

● **Pittsburgh's system** of COLOR DYNAMICS is based upon the influence which colors exert on human beings. Tests have shown some colors stimulate, others soothe and relax, while many fatigue, irritate and depress.

● **By using color** according to COLOR DYNAMICS on machines, the operator's attention is focused better on his work. Working parts are distinctly separated from stationary parts and material being fabricated. Eye travel is reduced. All this helps to lessen eye fatigue and nervous tension.

● **Morale-building colors** on walls and ceilings not only improve visibility, but also promote cheerfulness. This improves morale of workers. Safety colors on motorized equipment, cranes and traffic lanes reduce danger of time-loss accidents.

● **Thousands of plants** have been painted the COLOR DYNAMICS way because it is recognized as a distinct contribution to modern production technique. Why not begin now to teach your students the important advantages of such functional use of color?

We'll be glad to make an engineered color study—FREE!

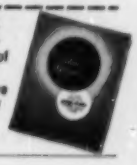
● Write today for a free booklet explaining how Pittsburgh's COLOR DYNAMICS can be put to work. Better still, we'll be glad to demonstrate the benefits of this painting method in your classroom. We'll provide an engineered color study without cost or obligation. Call the Pittsburgh Plate Glass Company branch nearest you and arrange to have a representative see you. Or mail this coupon.

Send for a copy of this book!

Pittsburgh Plate Glass Co., Paint Div.
Department 18-116, Pittsburgh 22, Pa.

☐ Please send me a free copy of your booklet "Color Dynamics."

☐ Please have your representative call for a Color Dynamics Survey without obligation on our part.



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PITTSBURGH PLATE GLASS COMPANY

IN CANADA: CANADIAN PITTSBURGH INDUSTRIES LIMITED

HOW-TO project for the School Shop

—by NICHOLSON FILE COMPANY

NO. 20 OF A SERIES

TRAMMEL BAR

Raw Material Required: 1 pc. 3/16" dia. x 13" long C.R.S. rod; 1 pc. 5/16" sq. x 6 1/2" long C.R.S. bar; 1 pc. 1/2" dia. x 1" long C.R.S.; 1 pc. 5/16" dia. x 2" long aluminum alloy rod; 1 pc. 3/4" dia. x 1" long C.R.S. rod; 1 pc. .093 dia. x 6" long drill rod; 1 pc. 3/8" dia. x 2 1/2" long drill rod; 2 pcs. 8-32 x 1" long Allen head cap screws; 1 pc. 8-32 x 1/2" long Allen head cap screws; 2 pcs. 8-32 x 1/4" long Allen head cap screws; 1 pc. 8-32 x 1 3/4" full thread screw.

Tools: 6" rule; scriber; layout blue; 8-32 tap; 6-32 tap; tap wrench (small); 1" micrometer; V block; 6" Square Bastard file; small center punch, RH lathe turning tool; hack saw, 8" Mill Bastard file; Machinist's Three Square Scraper; small drill press vise; #36, #27, #29, #18 drills; small center drill; 7/16" drill; 6" combination square; #44 drill; 3/16" drill; diamond knurling tool; straight knurling tool.

PROCEDURE

1. Heads. Lay out three sections on 5/16" square stock, two for main heads, one for fine-adjustment head. Allow sufficient width between layout for hack saw cuts. Remove burs using 8" Mill Bastard file.

2. Place the 3/4" dia. C.R.S. in three-jaw lathe chuck; using RH facing tool face off. Center drill, then drill through, using 7/16" drill. When finished, remove from lathe, place in vise and saw cut through one wall, bur all sharp edges, using Machinist's Scraper. This will be our lathe adapter for turning the 5/16" square previously sized. To check for proper hole size, use micrometer across corner of square stock and a reading of approximately .430 will result, hence the 7/16" hole.

3. Place adapter in lathe chuck, close down jaws till snug, then place cut heads one at a time into the adapter and close chuck until secure. Face off both ends of main heads to a length of 2 1/2". Use a RH facing tool. The small head is 1" long. Place 1/32" chamfer on one end of each head.

4. Lay out the 3/16" trammel bar hole, .375" down from chamfered ends and centrally located on the 5/16" face. Center-punch and drill a 3/16" hole in each. Use a drill press vise to hold pieces secure. Bur holes, using a point of Machinist's Scraper.

5. At the lathe, place heads one at a time in the adapter, center-drill, drill and tap chamfered ends, using #29 tap drill and 8-32 tap and handle. Lathe should be used for tapping, if not, check with your instructor for proper follow-up procedure. Tap until the 3/16" hole is met.

6. Next, reverse the main heads only. With the tapped end in the spindle, center-drill and drill through with a #44 drill. While still in position, set the lathe compound to an angle of 5 or 6 degrees. Using an RH turning tool and the lathe compound, turn until the dia. at the #44 hole end measures .125 across. Lathe file taper using 8" Mill Bastard file.

7. To complete the two main heads, measure down from the 3/16" dia. hole 1 1/8" and mark off with scale and scriber. On either side of this center line, scribe two additional lines 1/8" from center. Using 6" Square Bastard file, remove the corner to a depth of 1/8". Break all sharp corners. In the center of flat, center-punch and drill a #36 hole in each head. Use a V block for proper alignment in drill press. Tap 8-32 to meet #44 drilled hole.

8. Complete the small head by drilling a 3/16" hole 1/4" down from the trammel bar hole and 90 degrees to it. Using the square, scribe two lines on either side of this drilled hole, hack saw inside these lines, leaving a minimum amount for filing. Use the 8" Mill Bastard file to bring this slot to a plus 3/16" dimension. Draw-file all sides smooth.

9. To drill the 8-32 adjusting screw hole, place main body and adjusting body on a common 3/16" dia. rod and screw in place. Measure down from the bar hole 1/2" and in the center of the 5/16" face. Hole will pass through the fork and into the main body. Use a #29 tap drill, drill to meet the #44 center hole, #44 in the main body. Remove the assembly, and tap the main body, using 8-32 tap. Use a #18 drill for clearance in fork body.

10. Fasten a 1 3/4" long 8-32 screw with head removed into the threaded body. Place the fork on a common shaft and check for alignment.

11. Adjusting nut. At the lathe, chuck the 1/2" dia. C.R.S., drill and tap an 8-32 hole after which the O.D. is straight knurled with chamfered ends. Keep length shy of 3/16" for a free-running fit in fork.

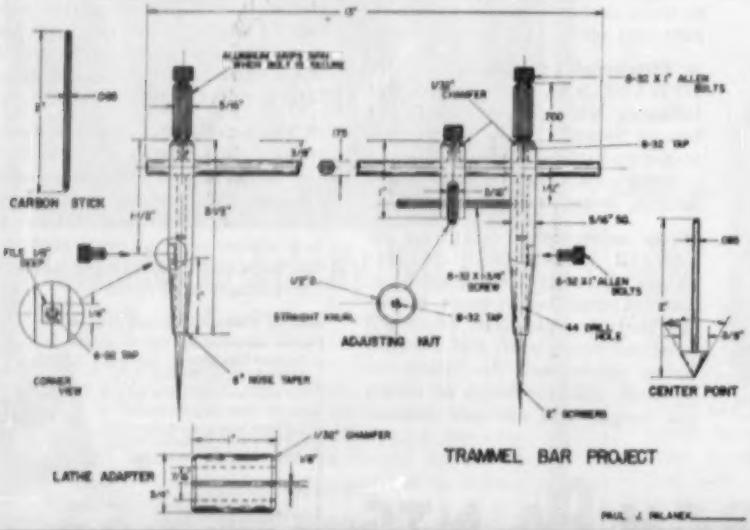
12. Finger grips. Machine in the lathe the free-turning finger grips (aluminum alloy). When complete, they should be .685 long with a #18 hole drilled through each. Both are diamond knurled, chamfered on ends.

13. Scribers. Work the 2 scribers in a lathe from .093 drill rod until they slip fit the #44 drilled holes. Use the 8" Mill Bastard file, file one end of each to a tapering cone. Full length of each insert is 2".

14. Center point. Machine also in the lathe the 60-degree center point, use 3/8" dia. C.R.S. Complete shank end first; chuck this end and lathe turn the 60-degree tip, using RH turning tool with lathe compound set to 60 degrees; file smooth.

15. Trammel bar. The remaining work is that of completing the 3/16" trammel bar itself. The bar can be of most any length, but we chose one of 13". This permits drawing of a 24" circle, also fitting into the average tool box. Chamfer both ends in the lathe, using 8" Mill Bastard file, then place in a vise with wood support beneath. Draw-file a flat along its entire length, using an 8" Mill Bastard file. When complete the micrometer dimension should be .175 + .000, – .005.

16. Assemble trammel bar as per sketch using standard specified Allen bolts and screws. When body lock screws are secured, the aluminum finger grips should pivot smoothly to permit free movement about any center. Standard dia. drafting lead can replace one scriber for a pencil compass, or the center point can be used to pivot in a drilled hole should the center punch be drilled away. Before final assembly, steel wool all square surfaces for a polished finish.



The Nicholson Mill Bastard and Square Bastard files are shown reduced in size from those specified in the text.

FREE REPRINTS OF THIS PAGE

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Industrial Arts and Vocational Education
The Shop Teacher's Professional Magazine
NOVEMBER 1956

A Student Merit Rating System—

It Works—
A Statistical Student Survey

RICHARD A. SCHENA
Haverhill Trade School
Haverhill, Mass.

Today's schools exist for the maximum good of all the pupils. One way to accomplish this objective is through a rating system. Consequently, this rating system was designed to serve a two-fold purpose. One is a means to motivate students, and the second is to facilitate placement by administrators into the unit trade division.

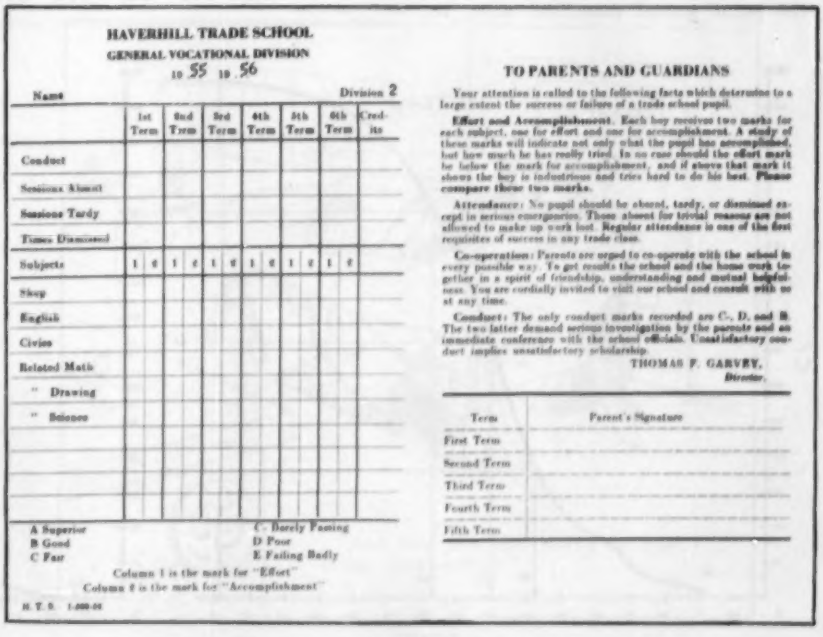
The Haverhill Trade School has a general vocational division into which freshmen students are enrolled for one year. The main objective of this year is to provide an orientation period sufficient to enable students and administrators to determine if there is a sufficient aptitude, normal intelligence, and sustained interest in a chosen trade to be followed during the three remaining years of enrollment.

The administrators have been faced with the task, at the close of the freshman year, of determining which students should be placed into which unit trade shop. Because there are eleven trades only a certain number of students can be satisfactorily cared for each year. The number graduating to a large extent determines the size of the group to be enrolled. Therefore, a common situation is one in which twenty freshmen, for example, desire to be placed in the carpentry shop when only fifteen, according to state standards, can be absorbed into this shop.

Prior to the development of this system, described in this study, administrators had recourse solely to a student's life-history card on which are recorded grades, attendance, etc. No definitive system of evaluating the progress of one student against another could be done without a great deal of time and investigation.

It was felt that if a student's activities during the school year could be reduced to a point system whereby those with the most points would receive their first choices, and those with fewer points their second choices, etc., justice to the students and facility in administration would result.

The point system was designed during



HAVERHILL TRADE SCHOOL
GENERAL VOCATIONAL DIVISION
19 55 19 56

Name ____ Division 2

	1st Term	2nd Term	3rd Term	4th Term	5th Term	6th Term	Credits
Conduct							
Sessions Absent							
Sessions Tardy							
Times Dismissed							
Subjects	1 2	1 2	1 2	1 2	1 2	1 2	1 2	
Shop							
English							
Civics							
Related Math							
" Drawing							
" Science							

A Superior
B Good
C Fair
C- Barely Passing
D Poor
E Failing Badly

Column 1 is the mark for "Effort"
Column 2 is the mark for "Accomplishment"

H. T. S. 1-500-55

TO PARENTS AND GUARDIANS

Your attention is called to the following facts which determine to a large extent the success or failure of a trade school pupil.

Effort and Accomplishment. Each boy receives two marks for each subject, one for effort and one for accomplishment. A study of these marks will indicate not only what the pupil has accomplished, but how much he has really tried. In no case should the effort mark be below the mark for accomplishment, and if above that mark it shows the boy is industrious and tries hard to do his best. Please compare these two marks.

Attendance: No pupil should be absent, tardy, or dismissed except in serious emergencies. Those absent for trivial reasons are not allowed to make up work lost. Regular attendance is one of the first requisites of success in any trade class.

Co-operation: Parents are urged to co-operate with the school in every possible way. To get results the school and the home work together in a spirit of friendship, understanding and mutual helpfulness. You are cordially invited to visit our school and consult with us at any time.

Conduct: The only conduct marks recorded are C-, D, and E. The two latter demand serious investigation by the parents and an immediate conference with the school officials. Unsatisfactory conduct implies unsatisfactory scholarship.

THOMAS F. GARVEY,
Director.

Term	Parent's Signature
First Term	
Second Term	
Third Term	
Fourth Term	
Fifth Term	

Front and reverse side of individual rating card

the fourth term, incidentally to get a graphic and numerical picture of a student's progress as compared with that of his classmates. The motivation factor was made manifest by each student keeping, filling out, and totaling his own rating sheet at the close of each term.

The rating system concerns four areas of school activity, viz., scholarship, conduct, attendance, and citizenship.

The scholarship rating is derived by reducing report card grades to the scholarship numerical value code, as indicated at the bottom of the rating sheet. The school's marking system is unique in that each student is graded for effort and accomplishment as explained on the reverse side of report card.

The conduct marks are derived in a similar manner. Near the close of the term a conduct mark which is reduced to numerical points is given.

It was felt the shop teachers should give conduct marks on the 2nd, 4th, and 6th terms only, since they have a six weeks course for each of the six general vocational groups. Attention is called to an apparent discrepancy. The reverse side of the report card states that conduct marks of C, C−, and D are recorded on the card. This conduct mark is given by the administrators when a particular situation warrants such action. The conduct marks recorded on the rating sheets are for rating purposes only.

The attendance factor considers only absences and tardinesses taken as a whole. It may be objected that the system penalizes a boy who may be absent with a long illness. It is to be noted that the point spread numerical value for attendance is not too significant when compiled on a yearly basis. The student who is absent may compensate for it by making up missed assignments, thus building up his scholarship rating. Whereas a boy who is absent and does not do this would not be compensating for it and, thus justifiably, be penalizing himself.

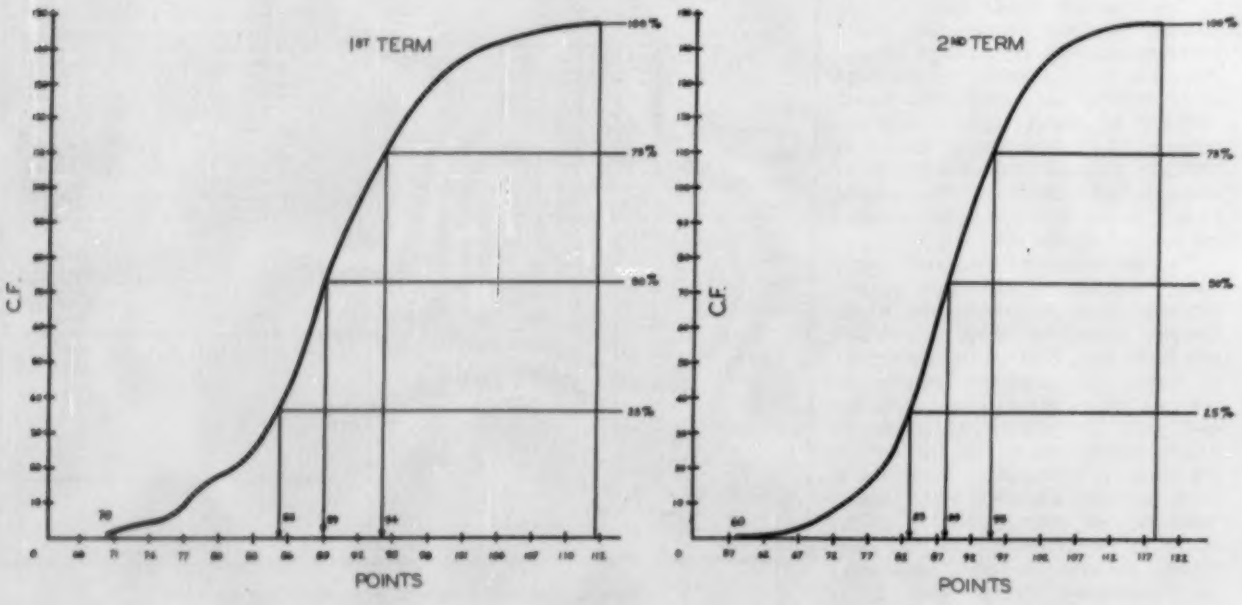
The citizenship factor was considered a significant part to encourage and to manifest its value in the educative process. A meritorious act outside regular school activity is rewarded with a commendation card and a notation on the student's life-history folder. In this category may be listed such things as manifestations of honesty — turning in lost articles to the office; of charity — buying food for poorer students, assisting duller classmates with assignments, etc.; scholarship — passing in outstanding extra-credit assignments; industriousness — doing commendable jobs during school and after in the name of the school; collecting for Red Cross, Community Chest, Heart Fund charities, etc. Each commendation card and notation is worth five points and is totaled in on the term score during which the act was performed.

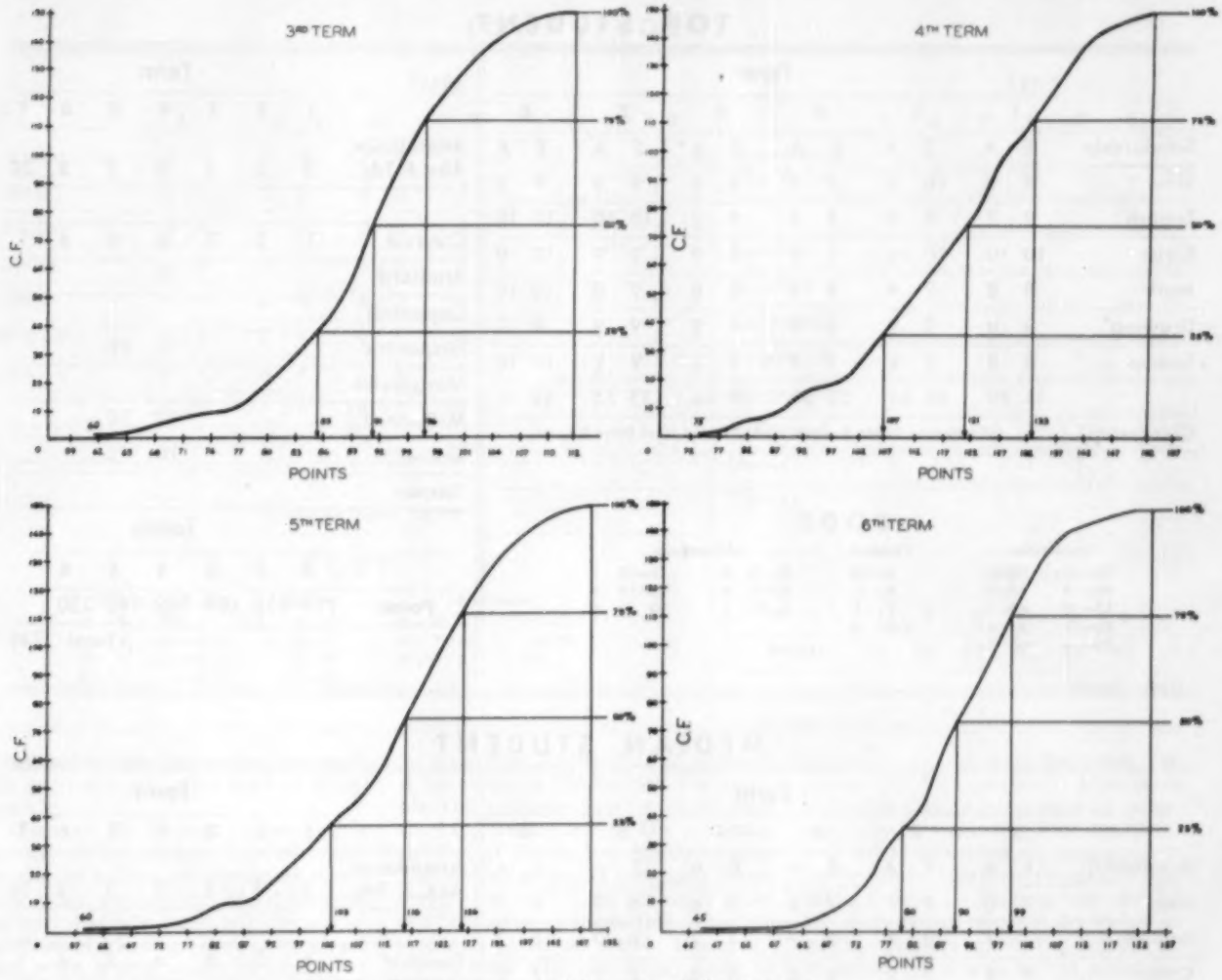
The statistical data which follow are included to indicate the reliability and validity factors of the rating system in relation to other measuring scales.

It is to be noted that the system was conceived during the third term and instituted with the fourth term. Conduct marks were assigned for the fourth and fifth terms only — the fifth excluding those of shop teachers, as explained earlier. This may explain the higher standard deviations for these terms. The relative high standard deviation for the last term where no conduct points were included may attest to the *carry-over* merits of the system. The points were totaled at the end of the fifth term to

TABLE 1. Statistical Findings of Rating System

TERM	NO. SCORES	HIGHEST SCORE	LOWEST SCORE	RANGE	M.	Md.	σ	σ	S.D.
1	148	111	70	41	89.5	89.4	85.3	94.1	7.62
2	149	116	58	58	89.5	89.3	83.5	95.5	9.25
3	150	111	59	52	90.3	90.9	85.0	96.6	9.48
4	150	153	70	83	119.5	121.5	107.1	133.8	18.50
5	149	145	53	92	114.5	116.7	103.3	126.8	17.00
6	148	120	41	79	89.5	89.8	80.9	99.5	13.45
6 Terms Accum.	148	748	360	388	594.0	598.5	549.5	639.5	64.60





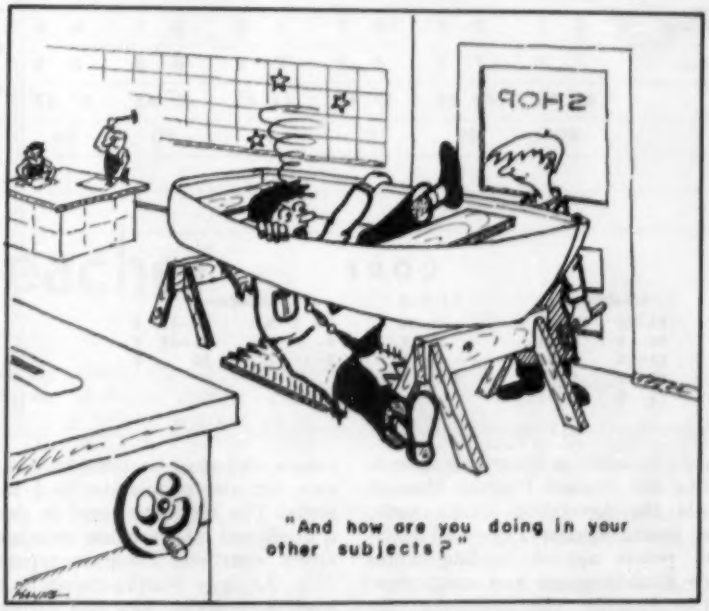
Curves constructed for each of the six terms

allow time in designating shop choices before the close of school. Therefore, the fifth term totals were the points used for placement. The variability in the number of scores is explained by the fact that some students entered after the first marking period and others left school during the close of the school year. There were approximately 148 students who were graded for six terms.

The first thing done after the scores for each term were totaled was to set up a frequency distribution chart for each term and one for the accumulated scores for six terms. Table I reveals the results of this statistical procedure.

The next step was to construct curves for each of the six terms. These are attached for study.

The next statistical procedure was that of correlation. The rating system was correlated with I.Q.'s from the California Test of Mental Maturity and California Reading Test which are given in the spring preceding entrance into the freshman class. However, the I.Q. and total reading scores were those of



Submitted by William S. Hanks, Western Illinois State College, Macomb, Ill.

TOP STUDENT

	Term 1		2		3		4		5		6	
	E	A	E	A	E	A	E	A	E	A	E	A
Scholarship												
Shop	9	9	10	9	7	7	8	8	9	9	9	9
English	8	7	9	9	9	9	9	9	10	10	10	10
Civics	10	10	10	10	9	9	10	9	9	9	10	9
Math	8	8	9	9	9	9	9	9	9	9	10	10
Drawing	8	8	9	9	9	9	9	9	9	9	9	9
Science	8	8	9	9	9	9	9	9	9	9	10	10
	51	50	56	55	52	52	54	53	55	55	58	57
Citizenship	(Life History Card* 5 points each) Canned Food Drive 5 points											

	Term 1	2	3	4	5	6	T
Attendance Abs. & Tdy.	5	5	5	5	5	5	30
Conduct	1	2	3	4	5	6	T
Bradford				10			
Cappozoli							
Fitzpatrick				10	10		
Margaretos							
McDonnell				10	10		
Shena				10	5		
Tierney							

CODE

Scholarship		Conduct	Attendance	
95—10	70—5	A—10	0— 3 5	12—15 2
90— 9	65—4	B— 5	4— 7 4	16—19 2
85— 8	60—3	C— 1	8—11 3	20 0
80— 7	55—2	C-D— 0		
75— 6	50—1			

Totals	1	2	3	4	5	6	
Points	111	116	109	152	140	120	
						Total	748

MEDIAN STUDENT

	Term 1		2		3		4		5		6	
	E	A	E	A	E	A	E	A	E	A	E	A
Scholarship												
Shop	7	6	7	7	7	6	5	6	6	7	6	7
English	7	7	8	7	8	7	7	7	8	7	8	7
Civics	9	8	9	9	8	8	8	8	7	7	7	7
Math.	8	8	8	8	8	7	8	8	8	8	10	10
Drawing	8	7	7	7	8	7	8	8	8	8	8	8
Science	7	7	7	7	8	7	8	8	8	8	8	8
	46	43	44	45	47	42	44	45	45	45	47	47
	89		89		89		89		90		94	

	Term 1	2	3	4	5	6	T
Attendance Abs. & Tdy.	5	5	5	5	5	5	30
Conduct	1	2	3	4	5	6	T
Bradford							
Cappozoli				5			
Fitzpatrick				1	0		
McDonnell				5	5		
Shena				1	1		
Tierney							
				12	6		

CODE

Scholarship		Conduct	Attendance	
95—10	70—5	A—10	0— 3 3	12—15 2
90— 9	65—4	B— 5	4— 7 4	16—19 2
85— 8	60—3	C— 1	8—11 3	20 0
80— 7	55—2	C-D— 0		
75— 6	50—1			

Totals	1	2	3	4	5	6	T
Points	94	94	94	106	111	99	
						Total	598

students included in the rating system.

Using the Pearson Product Moment formula the correlation results were: rating points against I.Q. — .61±.05; rating points against reading scores (grade total-language and comprehension) — .53±.06. The validity of the "r's" is of a satisfying and confident nature and may be considered significant for the population used in this study. The results attained in deriving a coefficient of variation enhance the above assertion. These are: points — 10%, I.Q.'s — 10.9%; points — 16%; reading — 10%. Identical number of cases were used in correlation and variation techniques. These are: 142 cases for points — I.Q., and 138 cases for points — reading. One may conclude, therefore, that the low percentage recorded in the variation lends greater credence to the rather high "r" derived.

In view of the fact that this rating system is of recent origin it may be

LOW STUDENT

	Term 1		2		3		4		5		6	
Scholarship	E	A	E	A	E	A	E	A	E	A	E	A
Shop	5	4	5	5	6	6	5	5	1	1	0	0
English	5	5	7	6	3	5	7	7	6	6	6	4
Civics	6	6	1	1	6	4	3	3	2	2	3	3
Math	6	4	6	3	5	3	5	3	5	3	4	5
Drawing	5	5	5	5	5	5	5	5	5	5	5	4
Science	5	5	5	4	5	4	5	5	5	4	4	4
	32	29	29	24	30	27	30	28	24	21	22	20
	61		53		57		58		45		42	
Canned Food Drive							*5					

	Term 1	2	3	4	5	6	T
Attendance Abs. & Tdy.	5	5	5	5	5	4	29
Conduct							
Bradford				0			
Cappozoli							
Fitzpatrick				1	1		
Margaretos							
McDonnell				5	1		
Shena				1	1		
Tierney							
				7	3		

Totals

	1	2	3	4	5	6	
Points	71	58	62	70	53	46	
						Total	360

CODE

Scholarship		Conduct	Attendance			
95—10	70—5	A—10	0— 3	5	12—15	2
90— 9	65—4	B— 5	4— 7	4	16—19	2
85— 8	60—3	C— 1	8—11	3	20	0
80— 7	55—2	C-D— 0				
75— 6	50—1					

pertinent at this time to speculate as to its implications in other fields of school activity.

First of all, it may be worthwhile to extend the system into the other grades as a basis for placement into a job upon graduation. The placement director has been faced with the serious problem of selecting a student for a good job when several would be eligible. It could be useful in determining the recipients of the many awards granted at graduation. In the field of guidance it has poignant possibilities. For example, the guidance director would have the I.Q., reading and PTMA (Prognostic Test of Mechanical Ability) scores. The statistical results contained herein present a picture of the percentile scales and the points corresponding. After the first term points are totaled a comparison of these with test scores could be made. He may note that a boy has an I.Q. of 105 with a corresponding reading score, yet his point total may fall around the 50th percentile. Here is an indication that an interview with an opportunity for counseling is necessary.

It would be interesting to compare a postgraduate follow-up study with the rating system. Do the boys who compile the most points manifest to the community qualities which the school can be proud of? For the time expended on the present study it is felt that the results are most worthwhile.

It Is Helpful — Try It

Self-Evaluation for the Shop Teacher

C. T. STOTT
Instructor, Industrial Arts Department
High School
Hanover, Pa.

Each category in the evaluation sheet is preceded with a check list to help in the final judgment or evaluation of that particular category. Place an (X) in the blank to the right of each statement in the check list, if you rate yourself poor or below average. Place a ($\surd$) if you believe yourself to be average. Place a ($\surd\surd$) in the blank if you honestly believe yourself to be outstanding. The number of X's, average $\surd$, or outstanding $\surd\surd$, will determine, to a great degree, the actual evaluation on each category. Rate the final evaluation on each category as (1) if poor, (2) if fair, (3) if average, (4) if outstanding, and (5) if excellent.

I. Preparedness

Check list:

1. Am I qualified by college preparation to hold my present position? ....
2. Have I taken any additional college credits beyond the required amount? ....
3. Do I keep abreast with current affairs in my field? ....
4. Am I a member in the various

professional organizations for my field? ....

5. Have I taken refresher courses lately on various aspects of general education? ....

Evaluation:

I rate myself in preparedness as ....

II. Teacher Appearance and Attitude

Check list:

1. Am I keenly interested in doing the best possible teaching job? ....
2. Am I co-operative with the administration and the other teachers? ....
3. Am I a stable, mature teacher who avoids emotional displays? ....
4. Do I take pride in my shop? ....
5. Do I take pride in the learnings of my students? ....
6. Am I a pleasant, easygoing individual? ....
7. Am I constantly planning and formulating new things for my teaching and shop? ....
8. Am I always neatly presentable? (Neatly dressed, clean shop coat, etc.) ....
9. Do I follow health and cleanliness rules regularly? ....

Evaluation:

I rate myself in Teacher Appearance and Attitude as ....

III. Pupil Attitude

Check list:

1. Are my pupils interested in the things I try to teach? ....
2. Do my pupils like shopwork? ....
3. Do my pupils like and respect me as a teacher? ....
4. Are my students revealing progressive steps of learning with each day's instruction? ....
5. Do my students take pride in their work? ....
6. Are my students eager to do clean-up and miscellaneous work duties? ....

Evaluation:

I rate Pupil Attitude as ....

IV. Physical Plant

Check list:

1. Have I thought and planned my shop to the best of my ability? ....
2. Have I constantly added or moved machinery to different places for better efficiency and use? ....
3. Do I have an up-to-date, neat tool panel or room for checking tools? ....
4. Is the lumber, finishing, storage room kept orderly and neat at all times? ....
5. Are all power machines safely guarded and in the best possible working condition? ....
6. Have I made safety lanes around all power machines? ....
7. Is my shop always kept neat and clean after each shop class? ....
8. Are all small parts and materials well organized and placed in orderly fashion? ....
9. Is my shop well lighted and neatly presentable at all times? ....
10. Is storage, both project and material, adequate for my needs? ....
11. Do I use visual aids liberally in my shop? (Includes project display, wall charts, etc.) ....
12. Are cleanup facilities, (sink and paper towels) adequate and kept clean? ....

Evaluation:

I rate the Physical Plant as ....

V. Professionalism and Ethics

Check list:

1. Am I a member of the local, state, and national teachers' organizations? ....
2. Do I take an active part in teacher activities? ....
3. Am I a contributing member to the various periodicals in my field? ....
4. Do I avoid gossip or sarcastic remarks when in the association of other teachers? ....
5. Do I respect the administration and and the other teachers for the part they are playing in public education? ....
6. Do I avoid telling personal bits of information, about myself or other teachers, to my students? ....
7. Do I always try to do what is morally right, regardless of the consequences? ....
8. Am I proud to be a teacher? ....

Evaluation:

I rate myself on Professionalism and Ethics as ....

VI. Course Planning

Check list:

1. Have I made up a good thorough course outline for all grades and sections, for the whole school year? ....
2. Do I use my course outline as a daily guide for my teaching? ....
3. Do I prepare each daily lesson in an interesting and thorough fashion? ....
4. Have I taken into consideration the dull student and the above average student in my teachings? ....
5. Do I give periodic lessons or demonstrations on various tools or other aspects of the shop? ....
6. Do I give periodic tests so that I can constantly measure the students' learning abilities and the effectiveness of my teaching? ....
7. Do I encourage and nurture the various character traits of my students. These include honesty, love of country and God, moral soundness, etc.? ....
8. Do I use enough visual aids, films, models, etc. in my daily teaching? ....
9. Is my philosophy, aims and objectives basically the same as that of the school itself? ....

Evaluation:

I rate myself in Course Planning as ....

VII. Records and Follow-up

Check list:

1. Do I keep accurate records on all tools and materials within the shop? ....
2. Do I keep accurate money records? ....
3. Is my pupil personnel chart a good functioning system for student and cleanup activities? ....
4. Do I alternate cleanup duties and responsibilities among my students? ....
5. Am I unbiased in grading projects? ....
6. Do I have a good accounting system of the used materials? ....
7. Do I have a follow-up file, in conjunction with the guidance instructor or separate, of the students who have graduated? ....
8. Is my teacher record book and attendance check kept up-to-date? ....
9. Is the shop library and correlating materials on vocational guidance adequate for the shop needs? ....

Evaluation:

I rate myself in Records and Follow-Up as ....

VIII. Inventory and Requisitioning

Check list:

1. Do I keep an accurate running inventory of all materials in the shop? ....
2. Do I use common sense judgment in requisitioning new machines and supplies? ....
3. Do I take an over all general inventory at least once a year? ....
4. Am I thorough in writing out trade names, specifications, and prices of all equipment and materials on my requisitions? ....
5. Do I check all materials with the purchasing list and with the req-

uisition when they arrive in my shop? ....

Evaluation:

I rate myself in Inventory and Requisitioning as ....

IX. COMMUNITY RESPONSIBILITY

Check list:

1. Am I a respected citizen of my community? ....
2. Do I occasionally take part in community affairs? ....
3. Do I keep the people of my community well informed by project display, open house, etc., of the work being done in the school shop? ....
4. Do I uphold my civic and religious responsibilities as a teacher of youth should? ....
5. Am I broad-minded and willing to accept suggestions from business and industrial leaders within the community? ....

Evaluation:

I rate Community Responsibility as ....

It Has Helped the Author, It May Help You —

Introducing a Limited Core Curriculum

J. H. BAILEY

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The term *core curriculum* is often used in referring to the basic core of knowledge found in a program of general education. The writer would like to use it here also as a basic core of knowledge found in a program, but in a program of industrial-arts education rather than general education.

Though we might not all agree as to the particular amount of emphasis which should be placed on any chosen area of work included in such a training program, this proposed program is set up around work, in four areas — drawing, wood, metal, and electricity. This work to be done in four laboratories or shops — drawing room, woodshop, metal shop, and electrical shop; and to be taught by four instructors — one for each of the areas mentioned.

The purpose of this suggested revision of the curriculum is:

1. To make learning more meaningful by integrating the four areas of work more closely.
2. To make learning more continuous — the program is required for all industrial-arts majors for their freshman, sophomore, and junior years. Over this length of time, instructors should become very well acquainted with the students — thus becoming better informed as to their needs.
3. To spread out areas of emphasis from just one (woodworking, in many instances) to four, with equal time allotted to each of the four.
4. To present a 24 semester hour program of shop or laboratory courses in the first three years of study. Professional courses may be offered in the junior and senior years in the necessary amount to satisfy semester hour requirements for major subjects in particular institutions.

Setting Up the Core Program

The first year, schedule the new course as *Freshman Core Shop*, 8:00 to 10:00, four semester hours, Monday, Tuesday, Wednesday, Thursday, and drop out of the industrial-arts program all freshman courses offered in the four areas of drawing, wood, metal, and electricity. It might be arranged, for instance, that on Monday all freshmen will have drawing, Tuesday — wood, Wednesday — metal, and Thursday — electricity. This sets up rather inflexible limits, but it is suggested only as a point of demarcation. It should be possible to make in the drawing class all drawings needed in the other areas — a great improvement over the old type drawings of cut-up blocks — drawings which were useless outside of the drawing class.

The second year in introducing the core, schedule *Freshman Core Shop* and, in addition, *Sophomore Core Shop* at the same time, on the same days, and for the same amount of credit as the

	Mon.	*Tues.*	*Wed.*	*Thurs.*
Freshman Core Shop	Drawing	Wood	Metal	Electricity
Sophomore Core Shop	Wood	Metal	Electricity	Drawing

		Mon.	*Tues.*	*Wed.*	*Thurs.*
8:00	Freshman Core Shop	Drawing	Wood	Metal	Electricity
to	Sophomore Core Shop	Electricity	Drawing	Wood	Metal
10:00	Junior Core Shop	Metal	Electricity	Drawing	Wood

		Mon.	*Tues.*	*Wed.*	*Thurs.*	
8:00	Freshman Core Shop	Drawing	Wood	Metal	Elec.	Section I
to	Freshman Core Shop	Elec.	Drawing	Wood	Metal	Section II
10:00	Sophomore Core Shop	Metal	Elec.	Drawing	Wood	
	Junior Core Shop	Wood	Metal	Elec.	Drawing	

freshman core shop, dropping all sophomore courses covered by core program. This would be the picture:

Notice that sophomores take wood on Monday instead of drawing and that all areas have been rotated one day so as not to conflict with the freshman core shop.

The third year, schedule *Junior Core Shop* in addition to sophomore and freshman core shop, and drop all junior classes offered in those areas which the core covers. The program would then look like this:

This program is based on a maximum of 30 freshmen. Naturally, if there were more students, another section of freshman core shop would need to be scheduled. In as much as one of the greatest rates of attrition occurs between the freshman and the sophomore year of college, possibly two sections of freshman core shop should be scheduled and only one sophomore and one junior section. This would work out into the weekly balanced program as follows (all 4 laboratories being in use all four days and all instructors scheduled for teaching all 4 days):

Courses for students in other curricula might be offered at any time after 10:00, such as pre-engineering or elementary education. Professional and elective industrial-arts courses could be offered at any time except for the period 8:00 to 10:00.

Advantages of the Proposed Core

1. Instructors will have contact with the students at least once a week continuously for three years. Such an arrangement, in the opinion of the writer, should lead to the establishment of better work habits and result in greater achievement.

2. Because the student has a greater length of time to solidify and orient in his mind the learnings absorbed in the curriculum, greater retention of learning might result.

3. This is a battle against the study routine of "memorize-and-forget" which a more staccato type of training encourages. The instructor can build up — in a course lasting three years — an appreciable amount of pertinent knowledge by continuously building up and increasing the difficulty of the material which he wants the student to learn. A very adequate amount of learning should have taken place by the end of three years — even with only one class meeting per week.

4. Instructors should know the students more closely after three years continuous contact, which will enable them to meet individual needs better.

5. The problem of scheduling classes becomes more simplified, in as much as there are fewer classes.

6. The problem of faculty assignment to classes may be handled within the department.

7. Instructors may more easily incorporate new material into the curriculum. Semester courses, having been described in the college catalogue, tend to resist change, and the instructor usually feels obligated to teach the course as it is described. This, of course, is desirable, but the writer feels the instructor would possibly be more alert to changes and quicker to adapt any such desirable material to his course outline if it did not involve too much routine paper work, such as changing the description of the course in the college catalogue might require.

This curriculum, as set up with the core, would allow 24 hours — 4 per semester for the first six semesters of the student's college career — for basic instruction in tools, materials, machines, etc. Those hours remaining within the total hours required for a major would be taken during the junior and senior years. Professional courses would monopolize the work of the student during these last two years.

Information That Is Good for Any Shop Student —

Statistical Description of Industrial Production

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The development of industrial arts in the United States may be compared with industrial production in the United States as described by Dewhurst in his book, *Americas Needs and Resources*.[1] In 1880 when manual training was in the process of development, our country used 40 billions of horsepower-hours of energy. Of this total 69 per cent was produced by animal power, 14 per cent by human effort, and 17 per cent by technological means. Manual training changed with the schools and the times to encompass the broader objectives of the industrial change which jumped the horsepower-hours of energy consumed from 40 billions in 1880 to 289 billions in 1940. Equally as significant as this change is the fact that 90 per cent of this energy was produced by technological means. Furthermore, Dewhurst predicts equally progressive changes in the decades ahead.

Industrial Arts Reflects Technology

The relationship between the technological development and our program of industrial arts has been clearly pointed out in Dr. Wilber's pronouncement on industrial arts as follows:[2]

> If, as has been pointed out, an important purpose of education relates to the transmission of the social culture, then the vital place which industry holds in the American way of life should certainly call for major emphasis upon those phases of the program that deal with its exemplification in the schools. . . . Industrial arts projects help to acquaint students with the industrial nature of American society.

Industrial arts in giving a picture of the industrial nature of American society, has held to its traditional pattern of organization. The elements of that organization have been areas of work; such as, drawing, woodworking, metalworking, electricity, and printing. There

[1] Dewhurst, J. Frederic and Associates, *Americas Needs and Resources* (New York: 20th Century Fund Report, 1947), Appendix 32.

[2] Wilber, Gordon O., *Industrial Arts in General Education* (Scranton, Pa., International Textbook Company, 1938), pp. 19–20.

have been some areas as transportation, textiles, ceramics, and handicrafts added, but a doctoral study by Dr. Louis J. Callan at the Ohio State University indicates the latter areas hold a comparatively small percentage of emphasis of the total work in industrial arts as shown in these figures:[2]

Per Cent of Emphasis of Technical Work in High School Industrial-Arts Classes

Woodworking	18
General Shop	16
Drawing	14
Metalwork	14
Electricity	11
Graphic Arts	8
Driver Education	8
Transportation	4
Handicrafts	2
Home Mechanics	2
Ceramics	1.7
Plastics	1
Textiles	0.3

A study of current statistics of industrial production indicates this does not seem to be a true reflection of our technological society. The figures quoted on the following pages will bear out this point.

A True Picture of Technology

Industrial arts in order to give a truer picture of the technology, seems to need a pattern for organization that will make it easier for the students to grasp its meaning. This pattern was outlined in a publication by the American Industrial Arts Association[4] in 1947, which suggested these five areas for industrial-arts work: manufacturing, transportation, communications, construction, and power. These areas of work can easily be adapted to portray the industrial nature of American society as indicated by the statistics quoted on the pages following this introduction.

The organization of industrial arts on the basis of the five areas mentioned can easily be accomplished within the physical setting of the general shop. Much of the activity work remains the same except it is related more clearly, from the student's viewpoint, to the industrial society being portrayed. Also a more comprehensive and balanced picture of the technology can be offered, better than in the former programs which were predominantly wood and metal.

The Transition to Five Areas

The transition from traditional areas to areas in manufacturing, transportation, communications, construction, and power can be made gradually, as one would develop a general shop — one area at a time. The area of manufacturing offers an excellent starting point because of its similarity to the current activities of the general shop. Upon entering the area the student may be offered a picture of the scope of manufacturing to give him perspective before initiating an activity in this area. In that way industrial arts assumes a context of portraying industry, which is closer to realizing its goals than when students only make projects.

Current Industrial Production

A view of the five areas of work may be presented by examining statistics that describe the number of workers in current industrial production. These statistics are published quarterly in a report from the United States Department of Commerce in Washington.[5] The figures used on the following pages come from the July, 1952, and March, 1954, issues. The statistics used have been selected as the more significant ones and have been placed under one of the five areas for use as a basis for presenting the industrial phase of the industrial-arts work.

TRANSPORTATION AREA

Moving Goods and People by Land, Sea, and Air

Number of Workers Employed in Transportation

	April, 1952	*March, 1954*
Making transportation equipment	1,283,000	1,409,000
Automobiles	662,000	636,000
Aircraft and parts	429,000	592,000
Ship and boatbuilding repairs	126,000	120,000
Railroad equipment	56,000	54,000
Making interstate railroads	1,404,000	1,215,000
Making local railway and bus lines	139,000	126,000
Making tires and inner tubes	94,000	85,000
Railway employees	1,264,000	1,089,000
Highway passenger transportation	227,000	*
Highway freight transportation and warehousing	796,000	*
Water transportation	142,000	*
Air transportation (common carriers)	85,000	*
Pipe line transportation	29,000	*
Services allied to transportation	184,000	*
Automotive and accessories dealers	*	811,000

Railroad transportation, although often neglected in the industrial-arts program, is the largest phase of the area when the number of employees is considered. Automotive transportation employs almost the same number. Making transportation equipment ties in closely with manufacturing, but the stress there is on design and function rather than on the process of manufacture.

MANUFACTURING AREA

The Processing of Raw Materials and Fabricating Them Into Useful Goods

Number of Workers Employed in Manufacturing

	April, 1952	*March, 1954*
Lumber and wood products (except furniture)	676,000	636,000
Sawmills and planing mills	406,000	346,000
Furniture and fixtures	291,000	290,000
Primary metal industries	1,146,000	1,012,000
Blast furnaces, steel workers, and rolling mills	560,000	504,000
Primary smelting and refining of nonferrous metals	47,000	48,000
Fabricated metal products (except machinery, transportation)	692,000	852,000
Ordnance and accessories	57,000	150,000
Machinery (except electrical)	1,274,000	1,206,000
Nonmetallic mining and quarrying	105,000	99,000
Instruments and related products	235,000	223,000
Stone, clay, and glass	451,000	429,000
Glass and glass products (pressed or blown)	123,000	78,000
Textile mill products	1,091,000	991,000
Broad-woven fabric mills	507,000	461,000
Knitting mills	209,000	193,000
Apparel and other finished textile products	993,000	1,102,000
Men's and boys' suits and coats	120,000	121,000
Men's and boys' furnishings and work clothing	239,000	276,000
Women's outerwear	274,000	349,000
Chemicals and allied products	530,000	540,000
Rubber products (except tires and tubes)	119,000	115,000
Leather and leather products	335,000	338,000
Footwear (except rubber)	217,000	227,000
Agriculture, forestry, and fisheries	6,488,000	*
Farms	6,127,000	*
Agriculture and similar service establishments	261,000	*
Forestry	24,000	*
Fisheries	76,000	*
Tobacco manufacturers	77,000	84,000
Food and kindred products	1,057,000	1,008,000
Meat	235,000	246,000
Dairy products	101,000	77,000
Canning and preserving	113,000	126,000
Bakery	184,000	173,000
Beverages	137,000	115,000

*Denotes statistics not available for that date.

[2] Callan, Louis J., *Industrial Arts Teacher Education Programs: A Comparative Analysis and Evaluation of Selected Teachers and Colleges*, unpublished dissertation (Columbus, Ohio: The Ohio State University, 1952). p. 186.

[4] American Industrial Arts Association, *The Industrial Arts Teacher*, "A New Type of Definition," Vol. 6, No. 3, Mar. 15, 1947, p. 4.

[5] United States Department of Commerce, Office of Business Economics, *Survey of Current Business*, Superintendent of Documents (Washington 25, D. C.: United States Government Printing Office), price, $3.25 per year.

Note that the metalworking industries employ over three million workers, by far the largest of any manufacturer. Care must be taken to illustrate the mass production methods utilized and also present material for study of the related mining and smelting processes. The study of textiles, not found in many industrial-arts programs, reflects an area of manufacturing that employs over twice as many workers as does the woodworking industry. Industrial-arts programs in schools without an agriculture department might consider reflecting the activities of the six million workers in agriculture, forestry, and fisheries. The home-economics program probably is most concerned with the million workers in food and kindred products, but note the emphasis here is factory production rather than home preparation.

COMMUNICATIONS AREA
The Transfer or Recording of Thoughts and Ideas

Number of workers Employed in Communications

	April, 1952	*March, 1954*
Printing, publishing, and allied industries	508,000	514,000
Newspapers	152,000	144,000
Commercial printing	167,000	168,000
Paper and allied products	403,000	436,000
Pulp, paper, and paperboard mills	210,000	218,000
Telephone	655,000	700,000
Telegraph	47,000	41,000
Radio broadcasting and television	58,000	*

Printing, publishing and allied industries combine with paper and allied products to make graphic communications which relate to the jobs of almost a million workers. This may be adequately reflected by a broad interpretation of the graphic arts area, which many industrial-arts programs now feature. The electricity area often includes the audio communications of telephony, telegraphy and radio, and now television is added.

CONSTRUCTION AREA
Development of Buildings and Homes, and Facilities for Transportation

Number of Workers Employed in Construction

	April, 1952	*March, 1954*
Federal and state highways	263,783,000	259,370,000
Construction of federal and state highways	92,142,000	91,151,000
State maintenance of federal and state highways	118,411,000	112,583,000
Contract construction	2,416,000	2,403,000

The construction of highways, involving over ninety-one million workers is almost entirely neglected in our current industrial-arts programs, but the activities of such a large number of workers merit some attention. Contract construction which is concerned with buildings and homes is often adequately covered.

Studies in the power area might be included as a phase of studies in the other areas because of the close association with the utilization of power. However, care must be taken to cover the various sources of power and the means of their transmission. The relative value of this area is probably not reflected by studying the number of employees as listed above, because the application of power is found in the other areas.

The statistics quoted above give a view of our industrial society only through the number of employees involved. Other statistics such as the volume of production, the dollar value of production, and the current trends in utilization give a broader basis for the study of this phase of the industrial-arts program and should be considered to give the proper perspective of each of the five areas.

POWER AREA
Harnessing Natural Resources to Provide Useful Energy

Number of Workers Employed in Power

	April, 1952	*March, 1954*
Gas and electric utilities	528,000	555,000
Heating apparatus (except electrical) and plumbers' supplies	115,000	92,000
Making electrical machinery	714,000	830,000
Products of petroleum and coal	197,000	177,000
Petroleum refining	155,000	138,000
Miping anthracite coal	61,000	41,000
Mining bituminous coal	356,000	237,000
Mining crude petroleum and natural gas	269,000	293,000
Local utilities and public services, n. e. c.	27,000	*

*Denotes statistics not available for that date.

*Denotes statistics not available for that date.

Troublesome But Necessary Bookkeeping —

Inventory of Expendable Materials in Industrial-Arts Shops

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Capital in the form of money and securities is usually very carefully guarded, while capital in the form of materials, equipment, tools, and supplies is rarely protected so carefully. Accounting of expendable supplies is often inefficient. Frequently there is little or no record as to when supplies, by whom, and for what purpose they were used.

The industrial-arts program offered in our public schools requires the use of expendable supplies for one or all of the following purposes:

1. Student projects
2. School and community projects
3. Maintenance of shop and school equipment
4. Student exercises for skill development

The nature of the administrative policy of the local school system determines the number of records to be kept. However, the most frequent nonteaching duties of the industrial-arts teacher are administrative in character. A few of these follow:

1. Requisitioning of expendable supplies
2. Accounting for expendable supplies
3. Maintaining a perpetual inventory
4. Pricing and selling expendable supplies
5. Writing specifications for expendable supplies
6. Recommending vendors of expendable supplies

7. Reporting expendable material consumption periodically

Both industrial-arts shop management and school accounting require reliable and accurate records for the following purposes:

1. To serve as a guide in the preparation of the budget.
2. To help to guarantee the integrity of school officials entrusted with custody of school money or materials.
3. To assist in the formulation of policy for the entire school system, or for any department of the system.
4. To help to measure program results.
5. To provide evidence that state laws are being met.

The literature of school administration and industrial arts makes frequent mention of the necessity of records and inventories. The importance of records for shop supplies was pointed out by Struck, who stated:

"Develop record forms showing the particular kinds or brands of all supplies used, and make notations on them, from time to time, that will be of help in the future. Prices should be available to the teacher and also to the pupils because intelligent planning should include a consideration of prices."

"A knowledge of sources of supplies is likewise valuable to pupils as well as to the teachers. Pupils may be taught to check all supplies as they are delivered to see, first whether the correct amount and kinds have been sent, and, second, whether they measure up to the specifications."[1]

In a recent study, Pendered found that one of the factors which contributed most heavily to the quality of the industrial-arts program was "Methods and Shop Management."[2] He recommended, on the basis of his findings, that industrial-arts teachers should:

Develop simple techniques of shop accounting including inventories and records of machines, tools, supplies, pupil projects, shop money; and similar items.[3]

A recent study by Mitchell reported that the most important activity concerned with shop records, inventories, and accounts was to maintain an inventory of equipment and supplies. It was found that *Maintaining an inventory of equipment and supplies* was rated the most important of this group by 245 teachers, was performed by 89.9 per cent, and was evaluated as desirable for future teachers by 91.7 per cent.[4]

Bluhm, in a recent study concerning good business procedures and practices relative to teachers' supplies, stated the following:

> In most schools, yearly inventories of all teaching supplies were made, but only a few schools kept running inventories of expendable supplies.[5]

The importance of accurate inventory records must be realized by school personnel, both teachers and administrators. The supply inventory represents, to some extent, the financial accounting for consumable materials and protects the integrity of those persons involved in their consumption.

The general pattern of an inventory record is determined by the type of information the administration of a school system desires. An accepted rule in any business implies that the number of record forms be kept to a minimum.

[1] F. Theodore Struck, *Creative Teaching* (New York: John Wiley and Sons, Inc., 1938), p. 99.

[2] Norman C. Pendered, "An Evaluative and Comparative Study of Industrial Arts Programs in Selected Junior High Schools of Pennsylvania at Various Levels of Financial Expenditure," Unpublished Doctoral Disseration, Pennsylvania State College, 1951.

[3] *Ibid.*, p. 129.

[4] John Mitchell, "The Identification and Evaluation of Instructional Units in Organization and Management of General Shop for Industrial Arts Teacher Education," Unpublished Doctoral Dissertation, Pennsylvania State University, 1954.

[5] George Philip Bluhm, Sr., "Suggestions for the Improvement of the Practices of Purchasing, Storing, and Distribution of Teaching Supplies Based on a Study of Some Small and Medium Size Schools in Pennsylvania," Unpublished Doctoral Dissertation, Pennsylvania State University, 1954.

The John O'Fallon Technical High School

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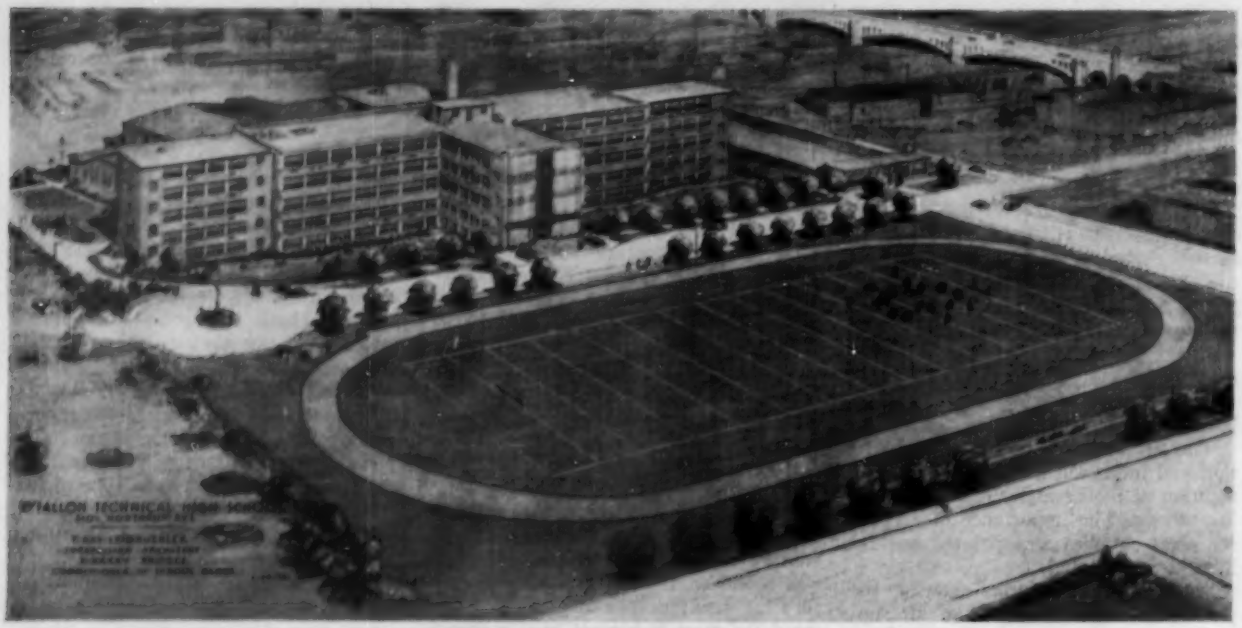
On February 22, 1853, a new institution in the city of St. Louis was chartered by the Missouri Legislature. It bore the name of "Eliot Seminary." On February 22, 1854, its board of directors changed the name to "The Washington Institute of St. Louis." On March 29, 1855, the name again was changed to "The O'Fallon Institute," and once more on February 22, 1856, the name "Washington University" came into existence. The Missouri Legislature, however, did not pass the act legalizing a change in the incorporated name from "Eliot Seminary" to "Washington University" until February 12, 1857.

In attempting to realize, at least in part, one of the purposes of this new institution, its board of directors, in 1854, established an Industrial Department known as "The O'Fallon Industrial School" under whose jurisdiction the O'Fallon Evening School was operated from August 3, 1854, to February 15, 1855.

Among the articles drawn up for the operation of the institution, Article II stated, "It shall comprise different departments, among which shall be a Collegiate Department, a Female Seminary, a Practical and Scientific Department, an Industrial School, and such other departments as the Board of Directors may determine."

The Industrial School was to "be established whenever an actual endowment of $10,000 shall have been secured; in addition to the two blocks of land demanded by Colonel John O'Fallon for this purpose; and, that said school shall be called 'The O'Fallon Industrial School' — in honor of John O'Fallon, who became the most liberal benefactor of the school."



The John O'Fallon Technical High School, St. Louis, Mo.

With this historical background, it was only logical that the present board of education, in looking for a name for its new technical high school, should honor the man so instrumental in founding St. Louis' first technical high school.

The primary function of this school is to provide educational experiences for those pupils who desire training for the purpose of obtaining immediately useful and gainful employment. College entrance requirements may also be fulfilled if the pupil expresses such a desire a year or more before his date of graduation from the eighth grade.

The new school located at 5101 Northrup Avenue, was opened on September 4, 1956. The anticipated enrollment, even now, is in excess of the planned capacity of the school — some twenty-five hundred pupils.

The O'Fallon Technical High School provides technical education for three general groups:

1. Boys and girls who attend all-day trade preparatory classes in which they hope to obtain training for earning their livelihood.

2. Building trades apprentices, who attend school part of the day and devote the remainder of the day to work experiences on the job.

3. A third group is classified as a part of the Adult Education program, serving those who attend either during the day or in the evening.

This type of school, by the very nature of its course content, contains conflicting features. The conflict is brought about by the fact that the basis of training is largely industrial and commercial. Training preparation in these fields necessitates noise production and perhaps some of the industrial odors. Because of the fact that some related and academic subjects demand quiet and isolation, we have a potential conflict. In consideration of these conflicts, the O'Fallen School has been designed to minimize this potential conflict.

The building has been planned in the shape of a cross, with a one-story wing attached to the east arm of the cross in which will be taught areonautics and auto mechanics. The central portion of the cross plain contains the majority of those rooms designed for technical training. Radiating from this central portion are the four wings. These wings, for the most part, contain some of the 40-odd typical classrooms.

In consideration of the groups which will use the building, most of the subjects will be taught principally to girls are confined to spaces on the two top floor levels. Most of the subjects which are taught to Trade Apprentices will be housed on the ground floor level. Those subjects which are taught principally to boys of the all-day trade preparatory group will be, for the most part, below the third floor. Typical classrooms and laboratories or shops, go to make up the 120 rooms, plus the general administrative facilities of the school.

The industrial courses include a wide variety of experiences, ranging through the alphabet from *A* through *W*. Subjects include areomechanics, architectural drafting, auto mechanics, commercial art, cosmetology, electricity, fashion tailoring, machine drafting, machine shop, millinery, printing, radio, welding, woodworking, and many others.

Some of the trade and industrial courses include shop sketching and blueprint reading, home economics, English, general mathematics, general science, physics, chemistry, world history, music, and elective subjects of a preindustrial nature, such as drawing, textiles, printer's arithmetic, commercial art, and the ninth grade industrial prevocational classes.

The O'Fallon High School will offer a wide choice in business courses, including general clerical, stenographic, and bookkeeping in which the student learns to operate a wide variety of modern office machines. The training in advanced office practice places a demand for office help far greater than the school can supply.

The High School Co-operative program, developed through co-operation between the regular high schools and the O'Fallon Technical High School, provides the students with an opportunity to supplement the general education offerings available in the home high school.

Each *co-op* student attends the home high school for one-half day and attends the O'Fallon for the other half day. He continues to take part in his home school activities and graduates with his class, since credits earned at O'Fallon are applied to meet graduation requirements in the home high school.

Seniors in the last term of the school are permitted to work in industry on a half-day basis. They work on jobs that include activities in their major fields and receive school credit for this work experience. These students presently are working in banks, universities,

schools, accounting firms, manufacturing and publishing companies, etc.

The John O'Fallon Technical High School, containing 351,262 square feet, or 5,523,175 cubic feet, with its more than 130 rooms and 60 departments, is a far cry from its parent school of more than 100 years ago. The original $10,000 endowment would today buy but one machine in but one of the many departments of the school.

Contracts for the construction of the school total more than $4,500,000 plus another $1,000,000 for equipment. In addition to the new equipment, much of the heavier equipment of the Hadley Technical High School was transferred to this new school. Equipment in many of the areas has been designed by the teachers. In the commercial department, for example, all of the student tables have been designed to give each child a separate table on which to work. Gone are the long benches for typists. They have regular office-type adjustable chairs. Tables in the mechanical drawing rooms as well as storage cabinets have been designed by the instructors.

The present Hadley Technical High School which has brought national attention to the St. Louis Schools will now house the Washington Technical High School and will become a comprehensive-type high school. In addition to the regular technical education offerings there will be a unit of some 500 academic high school students. Not all of the offerings in the two schools will be identical, for example: areomechanics will be offered in O'Fallon but not in Hadley, shoe repair and cleaning and pressing will be offered in Hadley but not in O'Fallon. In fact, most of the advanced courses will be offered in many areas only in the O'Fallon School. Students will be allowed to transfer from one school to the other in order to provide the best training experiences to fit needs.

With the opening of the school in September will also come the breaking of ground for a one and one-half million dollar addition to the rear of the school. This addition will include an auditorium seating some 1700 persons, a field house, a swimming pool, and the remaining adjuncts which will make the John O'Fallon Technical High School one of the finest of its type to be found in any city in any country of the world.

J. Ernest Kuehner, an Administrative Assistant to Dr. Philip J. Hickey, Superintendent of Instruction, has been appointed as Director of Technical, Industrial, and Adult Education to supervise the activities in these two schools and in all other high schools of St. Louis. The principal of O'Fallon Technical High School is E. W. Alexander, formerly the principal of Hadley Technical High School. Mr. Kuehner replaces Warren K. Begeman who retired in August of 1956.

Those attending the American Vocational Association which is being held in St. Louis, December 3–7 this year will want to arrange to spend some time in this new school. Tours will be arranged all during the convention and permission for small groups to tour on their own will be permitted.

CHART STORAGE AND DISPLAY

BRUCE J. HAHN
Assistant Professor, Industrial Arts Department
Oregon State College
Corvallis, Ore.

Shop teachers should make frequent use of visual material in chart form. Many fine charts are available from industrial sources. Teachers of industrial arts and trade and industrial subjects are better able than most teachers to make charts to fit their special needs because they have the necessary skills in drawing, lettering, and sometimes in photography.

Problems of storage and display discourage the use of charts. Storage of them in rolled form is not recommended. The roll usually gets crushed and the chart wrinkled. Furthermore, it is difficult to find the one wanted if it is in a stack of rolls.

A satisfactory method for chart storage is a large box or cabinet with a top that can be opened. Two support bars should be installed about three feet apart. The box should be about three feet high, thus permitting storage of charts up to three feet either horizontally or vertically. Each chart should be stapled to a strip of wood about 5/16 by 3/4 in. These can be saved from waste edgings. Each strip should extend two inches beyond the chart on both sides to permit hanging in the storage cabinet or on a display rack. Labels can be attached to the strips for rapid selection. Any chart can be removed or replaced easily. They are flat, smooth, and ready for use.

Chart storage stand

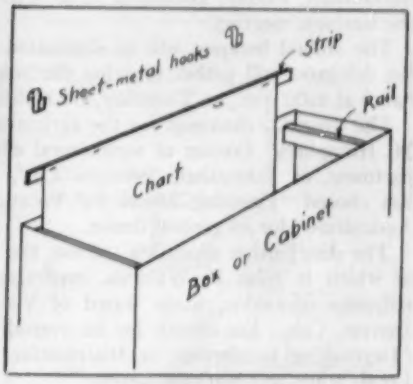


Chart storage cabinet

Charts mounted in this manner are easily displayed by using thin metal hooks on an easel, blackboard molding, or any other support.

Charts mounted on stiff backing, like the Stanley charts which are in common use, are often needed in the center of a shop. The device illustrated was designed by Professor Martin F. Johnson of Or State College. It serves the dual p of storage and display rack for this ticular type of chart. It was de signe to permit the flexible use of these chart sets at the workbenches.

Many of today's motor oils perform equally well in temperatures ranging from 40 degrees below to over 100 degrees above zero. — *Petroleum Newsnotes.*

Industrial Arts and Vocational Education

JOHN J. METZ, Editor

THE AVA CONVENTION IN ST. LOUIS

ST. LOUIS, MO., will be the host at the 50th Annual Vocational Meeting to be held December 2 to 7, 1956, when AVA members and friends of vocational and practical arts education from the United States, Canada, and Mexico will meet to discuss their common problems.

The convention theme for this annual gathering in 1956 will be "Fifty Years of Progress." Copies of the Golden Anniversary issue of the AVA Journal will be included in the registration envelopes as the visitors register.

This issue will not only give an over-all 50-year history of vocational and practical arts education, but also the 50-year histories of each phase of the program.

The schedule of meetings has been so arranged that *some* evenings will be free of convention events.

The first general session will be held at 10:30 a.m., on Wednesday, December 5. The second general session has been scheduled for Thursday, December 6, at 10:30 a.m.

The House of Delegates will meet at two separate meetings. The first, to be held at the Sheraton Jefferson Hotel, Wednesday, December 5, at 8:00 p.m., when the annual report will be presented. The second will be held at the Kiel Auditorium, Friday, December 7, at 9:00 a.m. This will be the business meeting.

The annual banquet will be eliminated this year. Instead the delegates will gather to enjoy the Ship's program and a dance at 8:00 p.m., on Thursday, December 6.

The program chairman for the agricultural section is Carl M. Humphrey, director of agricultural education, State Department of Education, Jefferson City, Mo. This section has chosen "Planning Ahead for Vocational Education in Agriculture" for its general theme.

The distributive education section, the program chairman of which is John R. Waldeck, supervisor, division of distributive education, State Board of Vocational Education, Denver, Colo., has chosen for its over-all convention theme "Developing Leadership in Distributive Education on the Local, State, and National Levels."

Meetings will be held Monday, Tuesday, Wednesday, Thursday, and Friday.

George E. Mowrer, expert on guidance and associate professor of education, Western Michigan College, Kalamazoo, Mich., has arranged a program for the guidance section which will go into session on Tuesday at 9:00 a.m. Succeeding meetings will be held throughout the day culminating in a 7:30 to 9:00 evening session. Work group sessions are scheduled for Wednesday.

With Dr. H. H. London, professor of industrial-arts education, College of Education, University of Missouri, Columbia, Mo., as program chairman for industrial arts, and F. J. Konecny, executive assistant, Texas Engineering Extension Service, Texas A. & M. College, College Station, Tex., as program chairman of the Trade and Industrial section, it is safe to conjecture that the programs of these two important divisions of the AVA will have as many or more sessions than at any previous AVA annual meeting. Add to these discussions on technical education sessions and one can get a slight picture of what the 1956 AVA convention is offering to those who attend.

The new John O'Fallon Vocational-Technical High School also offers an attractive bait to those who attend the AVA convention.

DR. CHARLES W. SYLVESTER RETIRES

ANOTHER widely known leader in vocational education is leaving this field in compliance with the demands of compulsory retirement regulations.

Dr. Charles W. Sylvester was born on June 9, 1886. He received his B.S. degree from the University of Maryland in 1908. From 1908 to 1910 he was assistant director of manual training in Norfolk, Va. From 1910 to 1913 he taught industrial arts at Indianapolis, Ind., and from 1912 to 1914 he was supervisor of sales for the Industrial Education Company.

Then he was director of industrial education at Springfield, Ill., from 1914 to 1916, after which he occupied the post of director of vocational education at Hammond, Ill., from 1916 to 1918. He was appointed District Vocational Officer — soldier rehabilitation, Federal Board of Vocational Education, Chicago, Ill., for the period from 1918 to 1921.

He was then appointed chief of the rehabilitation division of the U. S. Rehabilitation Office. In 1922 he left that post to go to Baltimore as director of vocational education. In 1947 he was named assistant superintendent for vocational education, and has served in that capacity up to the present.

Before his retirement on June 13, 1956, he was honored again and again by every kind of testimonial program by civic and school groups. The high point was reached on June 5 at a program staged at the Mergenthaler Vocational Technical High School by Baltimore's six general vocational schools and the two vocational-technical high schools.

The testimonial tendered him at the Mergenthaler celebration probably best describes him. It is titled "The Master Craftsman," and it reads as follows:

"We honor him tonight as the beloved and inspirational leader in this field. He is a respected and reserved personality not alone in our own city but one whose name is synonymous with vocational education and its accomplishments in our state and nation as well.

"His life work has designed and built a firm foundation and a lasting structure. It was the work of the mind, the hands and the heart of a great builder. It will stand against the ravages of tide and time for he has built upon the rock of righteousness — he is the Master Craftsman — Dr. Charles W. Sylvester."

In a letter dated June 21, 1956, addressed to his friends, co-workers, and associates of Baltimore and elsewhere, Dr. Sylvester writes:

"As I approach the day of retirement, July 1, 1956, from the Assistant Superintendency for Vocational Education in the Baltimore Public Schools, I pause to reflect upon the activities of the past and ponder the problems of the future.

"I leave the position which I have held for nearly thirty-four years with a grateful heart and full appreciation for the loyal and untiring support of my associates and friends in education, business, industry, and labor.

". . . I hope to . . . keep in contact with my many friends here and throughout the United States, and especially with those who have taken an active part in the educational service of our Division for the past one-third of a century."

All of us in industrial arts and vocational education will miss this man much, but we trust the future will treat him kindly, and that he will be with us for a goodly number of years.

Problems and Projects

DESIGN FOR SHOP TEACHERS

ALEXANDER F. BICK
Teacher in Milwaukee Schools
The Milwaukee Downer College
Milwaukee, Wis.

Using hot or cold rolled steel in the spirit of the age presents as much of a challenge as does the use of brass, aluminum, and stainless steel. The latter are most frequently seen in contemporary products. Schools have easy access to mild steel, and its price is favorable too.

Wrought iron, on the other hand, is a middle age material. Its black scale and characteristic roughness were its mark of the times. The medieval smith used it so freely that it became one of the symbols of his age. It became an important mode of expression, so much so that many of the forms then in vogue were created on the smith's anvil. Even stone and wood carvings of that period give clear evidence of this. One of the most representative forms of the medieval times was forged scrolls. The typical texture was that of expert hammer work; not careless and not conspicuous, otherwise it could hardly have

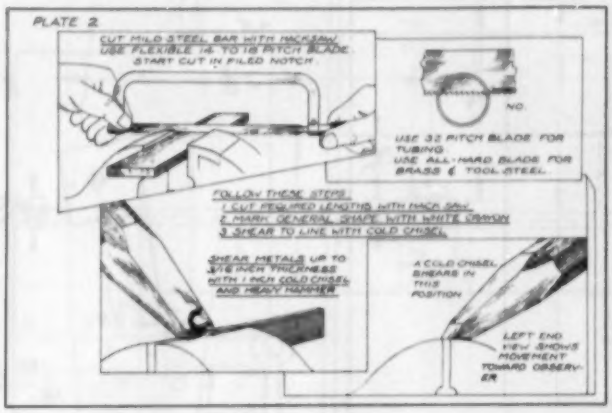


PLATE 2
CUT MILD STEEL BAR WITH HACKSAW. USE FLEXIBLE 14- TO 18 PITCH BLADE. START CUT IN FILED NOTCH
USE 32 PITCH BLADE FOR TUBING
USE ALL-HARD BLADE FOR BRASS & TOOL STEEL.
FOLLOW THESE STEPS:
1 CUT REQUIRED LENGTHS WITH HACK SAW.
2 MARK GENERAL SHAPE WITH WHITE CRAYON
3 SHEAR TO LINE WITH COLD CHISEL
SHEAR METALS UP TO 1/16 INCH THICKNESS WITH 1 INCH COLD CHISEL AND HEAVY HAMMER
A COLD CHISEL SHEARS IN THIS POSITION
LEFT END VIEW SHOWS MOVEMENT TOWARD OBSERVER

Plate 2. Explanations of operations

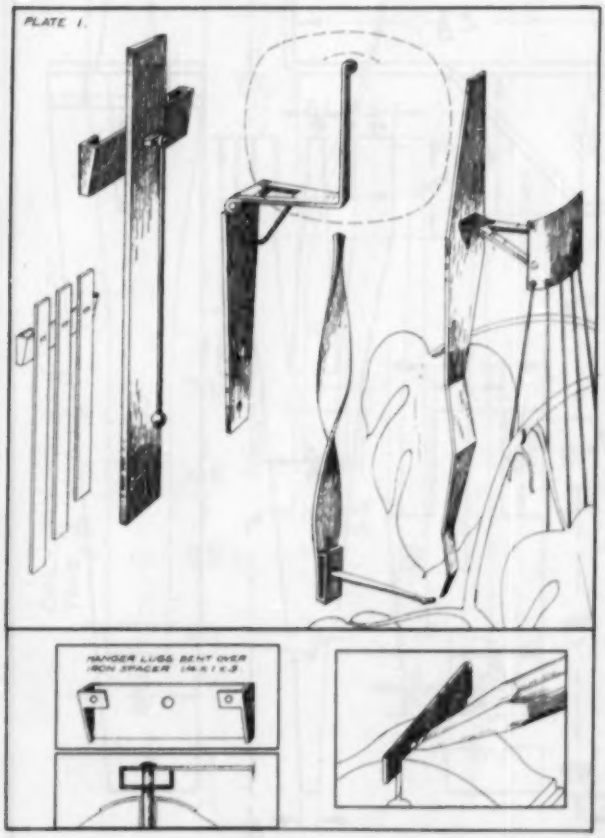


Plate 1. The chimes, string holder, and plant or vine holder

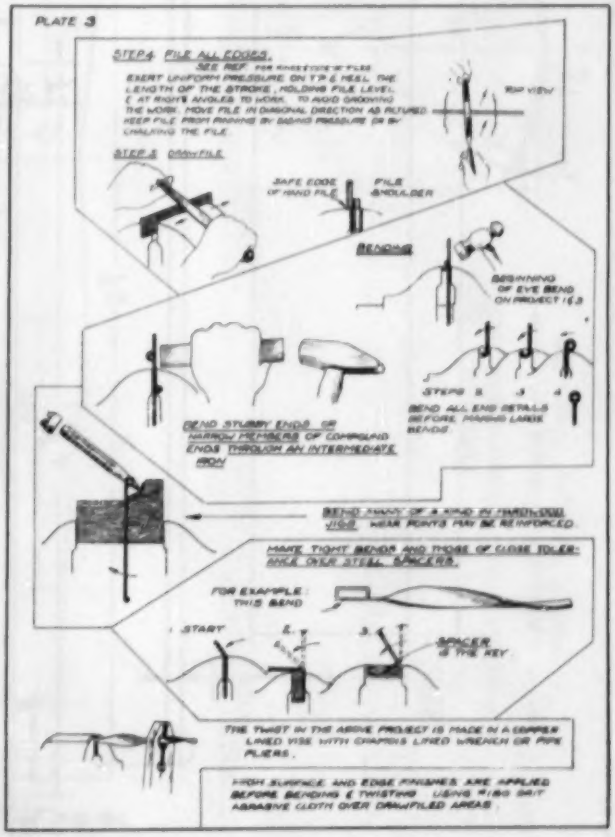


PLATE 3
STEP 4 FILE ALL EDGES.
STEP 5 DRAW FILE
SAFE EDGE OF HAND FILE
FILE SHOULDER
BENDING
BEGINNING OF EYE BEND ON PROJECT 1 & 3
BEND STUBBY ENDS OF NARROW MEMBERS OF COMPOUND ENDS THROUGH AN INTERMEDIATE IRON
BEND ALL END DETAILS BEFORE MAKING LARGE BENDS
MAKE TIGHT BENDS AND THOSE OF CLOSE TOLERANCE OVER STEEL SPACERS.
FOR EXAMPLE: THIS BEND
START
SPACER IS THE KEY
THE TWIST IN THE ABOVE PROJECT IS MADE IN A COPPER LINED VISE WITH CHAPMAN LINED WRENCH OR PIPE PLIERS.
HIGH SURFACE AND EDGE FINISHES ARE APPLIED BEFORE BENDING & TWISTING USING #180 GRIT ABRASIVE CLOTH OVER DRAWFILED AREAS.

Plate 3. More explanations of operations

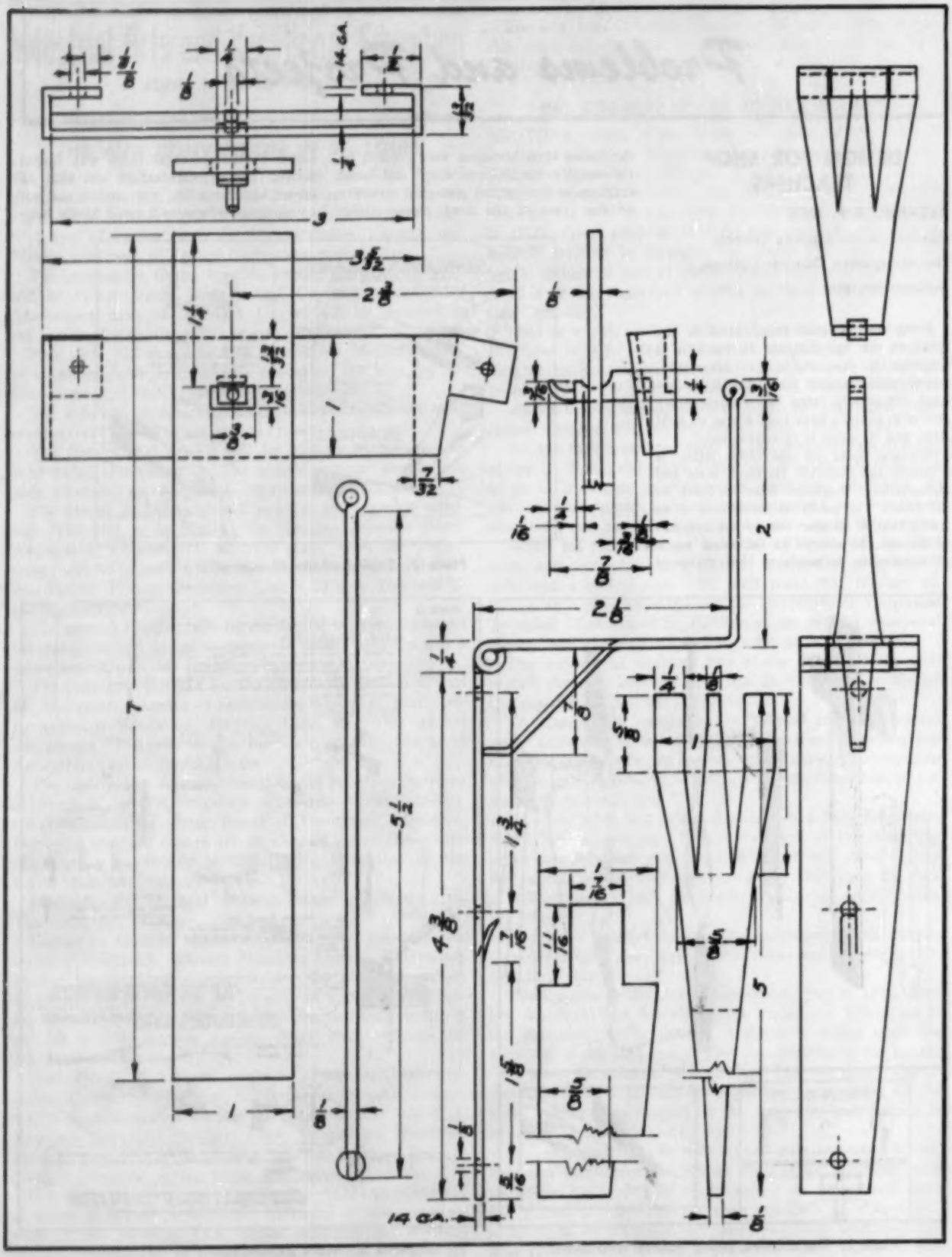


Fig. 1. Details of the dinner chime and string holder

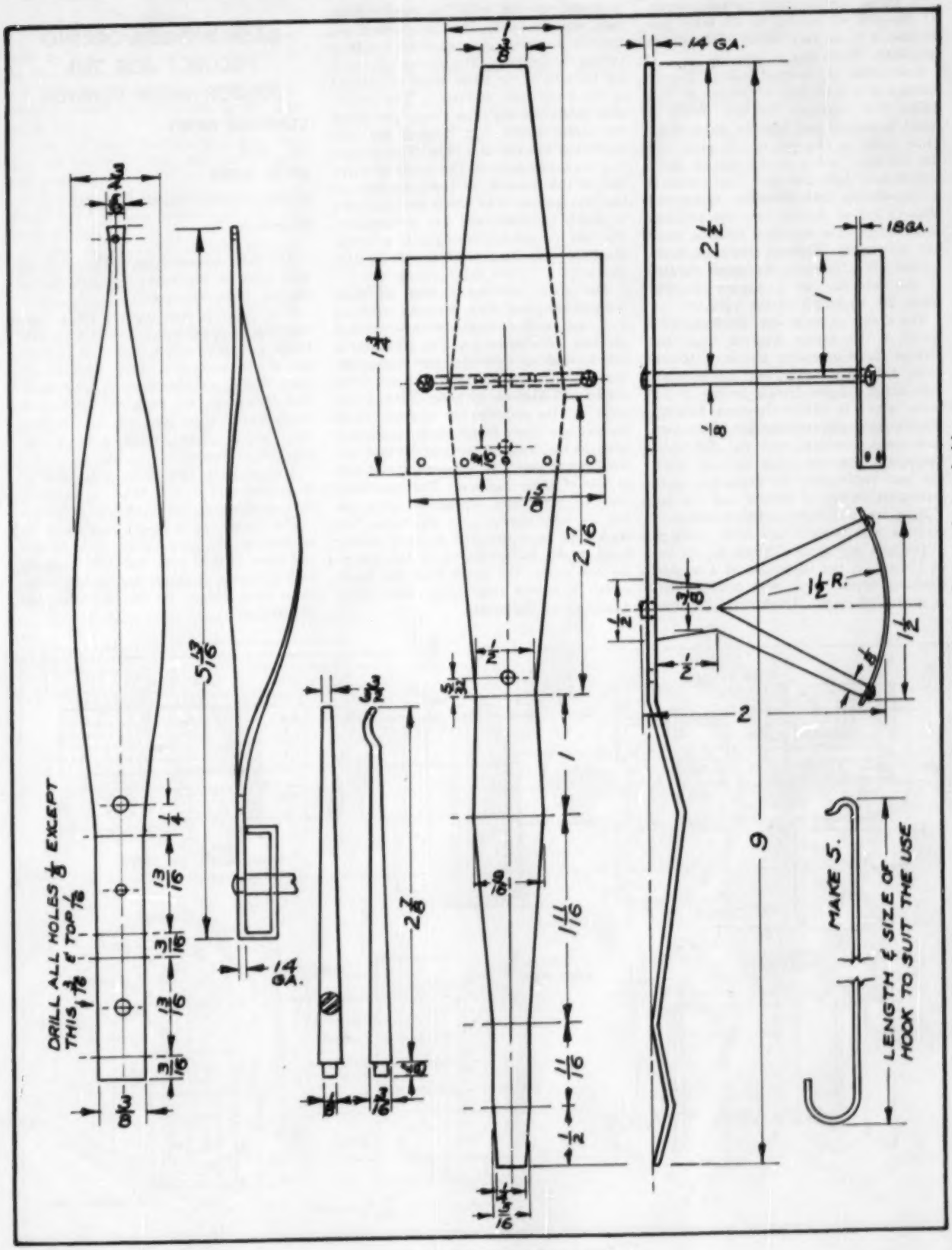


Fig. 2. Details of the plant and vine holder

been expert. To attribute peening merely for the sake of peening to the early professions is to be very unfair to its master craftsmen. There was no peening.

Everything is changed today. Present practice is a forthright expression of that which best expresses the day. Work in metal is smooth and brightly polished because today is the age of the press and the machine, and it is the day of speed and time, of light and space, and therefore of smoothness and cleanness. Hammered textures are as foreign to a machine age as would be men in armor strolling down our city streets. Medieval effects are hypocritical. The forms of the anvil imitated in this late day are a masquerade. Our forms are no longer of the anvil.

The design of mild steel projects, illustrated in this article, fits our time. The articles made according to the directions given, are smooth and clean. Furthermore, they carry out the typical feeling of our times, which is, beside cleanness, honesty, freedom from the constrictions of the past, spontaneity, newness, and the dignity of simplicity. They are what they are without fear, forthrightly the expression of an incomparable age of science and the air.

Here are four highly polished mild steel projects with smooth and clean surfaces.

The first is a dinner chime. At the left of Plate 1, is the suggestion of a musical sounding device, made with multiple bars of graduated length. These could be tuned to sound up the scale by merely filing both ends to pitch. The next toward the right is a string or yarn holder with a cutting device below. The cutting and bending forward of the latter chisel is pictured at the lower right in Plate 1. The project also holds kitchen bills, etc., by lifting the string holder and hanging the bills under the bracket arm. The third project is a towel or cap hook. The model of which this is the drawing, is blued by heat at the bent section after which the remainder is highly polished, and all is lacquered. The last project to the right is a houseplant or vine hanger, as the illustration shows.

The steps for the making of these projects are given in the drawings on Plates 1, 2, and 3. For details of these various projects see Figures 1 and 2. However, it will be well to note that the rectangular hole in the sounding bar, project 1, is drilled and filed on its node. To find this point, lay the undrilled bar on cords which are strung across a frame. Scrape chalk dust over the bar. Tap the bar until the dust collects at two points on its surface, and drill at one of these locations. The hole must then be filed large enough to allow the bar to hang freely over its hook. The hook must be wound with string or rubber band in the hollow on which the sounding bar hangs. The latter must not touch metal. It should ring clearly when these directions are followed.

BASE WOODWORKING PROJECT FOR THE JUNIOR HIGH SCHOOL

CLARENCE PARRY

and

PETER RIDER

Shenendehowa Central School

Elnora, N. Y.

Are your classes large? We are faced with some in our junior high school that number 35 to 40 pupils.

Due to such large classes we are attempting to design and utilize base projects which give the boys a choice of projects and at the same time allow them to express themselves personally in their work. This streamlines our work and helps us to attain course objectives, and at the same time handle large groups with a fair measure of success.

The projects have been well received in general and it also helps to eliminate tool, equipment, and materials problems.

The pupils have been encouraged to supplement the base design with designs and ideas of their own, and have come up with a variety of shapes and designs other than those shown in the accompanying illustrations.

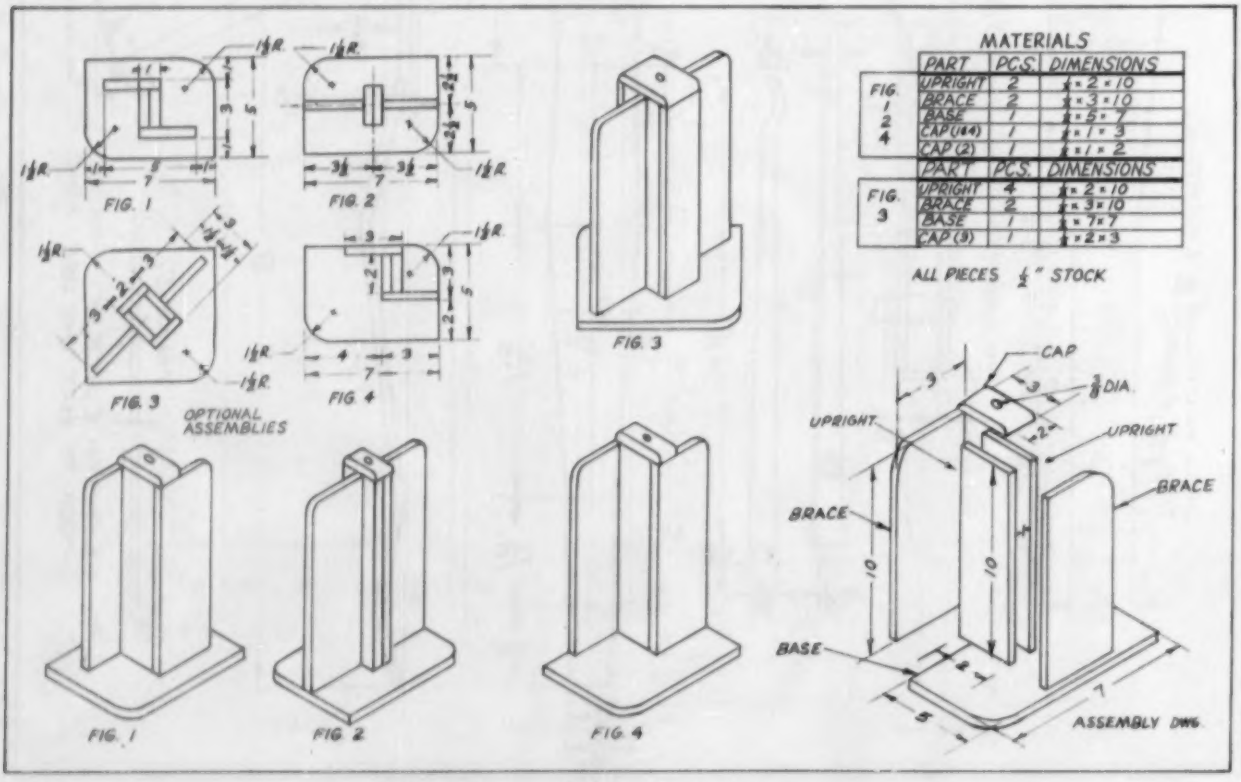


FIG. 1
FIG. 2
FIG. 3
OPTIONAL ASSEMBLIES
FIG. 4
FIG. 3
MATERIALS
PART | PCS. | DIMENSIONS
FIG. 1, 2, 4
UPRIGHT | 2 | ¼ × 2 × 10
BRACE | 2 | ¼ × 3 × 10
BASE | 1 | ¼ × 5 × 7
CAP (U44) | 1 | ¼ × 1 × 3
CAP (2) | 1 | ¼ × 1 × 2
PART | PCS. | DIMENSIONS
FIG. 3
UPRIGHT | 4 | ¼ × 2 × 10
BRACE | 2 | ¼ × 3 × 10
BASE | 1 | ¼ × 7 × 7
CAP (3) | 1 | ¼ × 2 × 3
ALL PIECES ¼" STOCK
CAP
⅜ DIA.
UPRIGHT
UPRIGHT
BRACE
BRACE
BASE
ASSEMBLY DWG.
FIG. 1
FIG. 2
FIG. 4

Details of modern lamp bases

Procedure

1. The stock was cut to rough dimensions on the circular saw and handed to the boys choosing the project.
2. Smooth and square all stock to the finished dimensions indicated in the materials list.
3. At this point the boys plan what design and assembly they will use in their own projects.
4. Lay out, drill, or bore holes in base, upright, and cap as required by the individual lamp.
5. Lay out any arcs or straight lines that the lamp requires.
6. Sand all parts.
7. Using glue and No. 18 by 1-in. wire brads, assemble braces and uprights.
8. Lay out location of upright on base dependent on design and fasten to uprights.
9. Socket and continuous threaded pipe are fastened to the cap with a fixture nut prior to fastening cap to upright.
10. Sand all parts with fine sandpaper and complete wiring of socket and plug.
11. Cement a felt or blotter bottom to the lamp base.
12. Apply finish as desired, preferably a stain and clear lacquer or varnish.
13. Rub finish down and wax entire project.

In analyzing this project we came up with the following list of processes, operations, and related lessons topics which are related to the project.

Operations processes and related lesson topics:

1. Squaring stock to given dimensions.
2. Use of block and jack planes.
3. Sharpening and honing plane irons.
4. Use and care of a jig saw.
5. Shaping and smoothing with files.
6. Types of files and their use.
7. Sanding and sandpaper.
8. The "Underwriters Knot."
9. Wiring a plug and socket.
10. Boring and auger bits.
11. Nails and their uses.
12. Glue, its use and use of clamps.
13. Staining and types of stain.
14. Shellac and its application.
15. Board measure and figuring cost of materials.
16. Appreciation for industrial planning and processing.
17. Use of basic layout tools.
18. Lumbering and tree structure.
19. Design and construction of various projects.

From the illustrations that accompany this article, the analysis and the procedures, it is readily seen that the potential of similar projects has unlimited teaching points.

SOCKET WRENCH

ALFRED GRAYSHON
Machine Shop Instructor
Olney High School
Philadelphia, Pa.

The socket wrench offers good machine-shop practice, and makes a useful flexible tool for sockets.

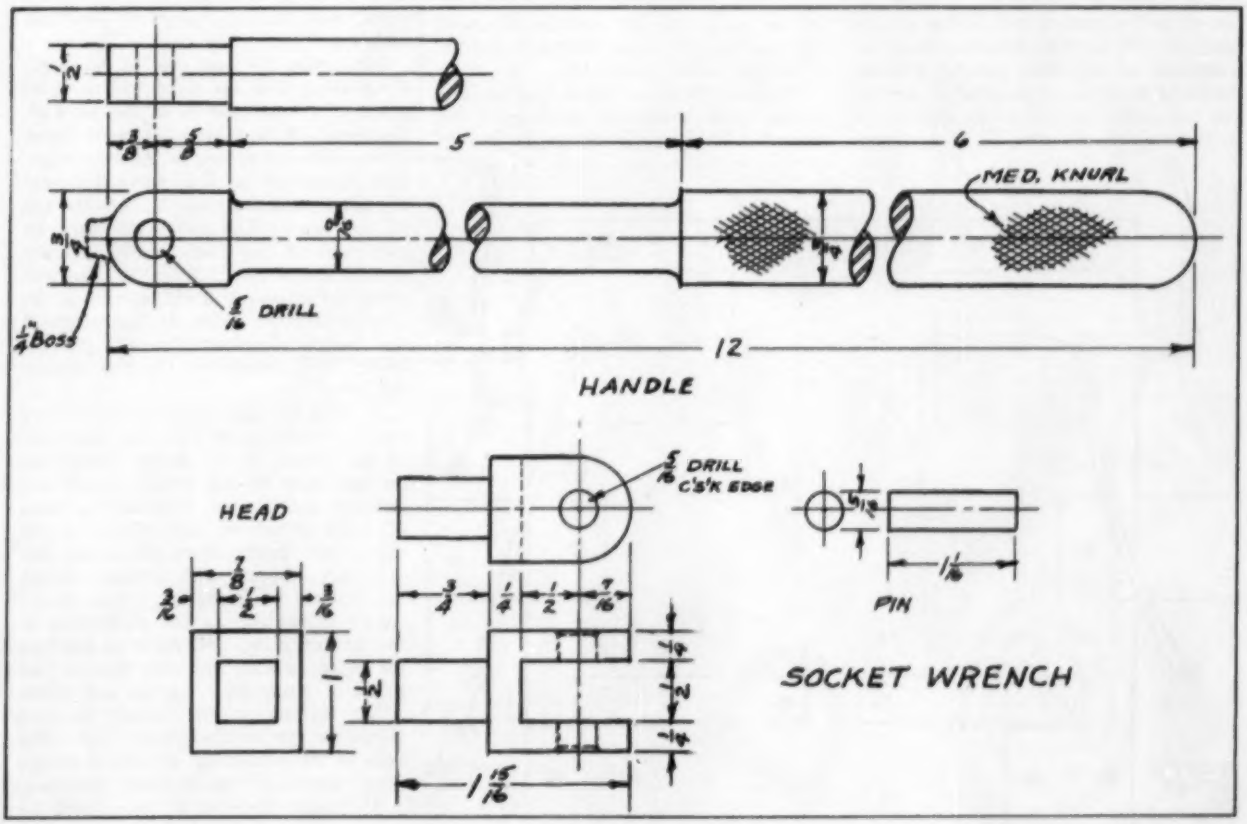
Procedure

Handle

1. Cut 12 ¼-in. length of ¾-in. C.R.S.
2. Center drill the ends.
3. Mount between centers of the lathe and face the ends.
4. Turn the ¾-in. diameter.
5. Knurl half the length.
6. Turn the 9/16-in. section.
7. Mill the flats on one end.
8. Lay out the milled end.
9. Center punch and drill the 5/16-in. hole.
10. File the milled end as shown in the working drawing.
11. Chuck the job in the lathe to round the knurled end.

Head

1. Cut a 2-in. length of 1-in. square C.R.S.
2. Shape one surface to make the ¾-in. size.



Details of the socket wrench

3. Lay out.

4. Mill the ½-in. square, holding the piece in the vise.

5. File as shown in the working drawing.

6. Center punch and drill the 5/16-in. hole.

7. Hold in the vise to mill the slot.

8. Countersink the outer edge of the hole slightly on each side.

Assembly

1. Cut a piece of 5/16-in. drill rod 1 1/16 in. long.

2. Place the pin in the hole of the head with the handle in place.

3. Peen over the ends of the pin to hold the parts together.

4. Flush file outside surfaces.

5. Bevel the edges of the ½-in. square slightly so that it fits freely into the sockets.

CONVERSION OF 6-VOLT BRAKE REACTION DETONATOR FOR USE ON 12-VOLT SYSTEM

E. L. BARNHART

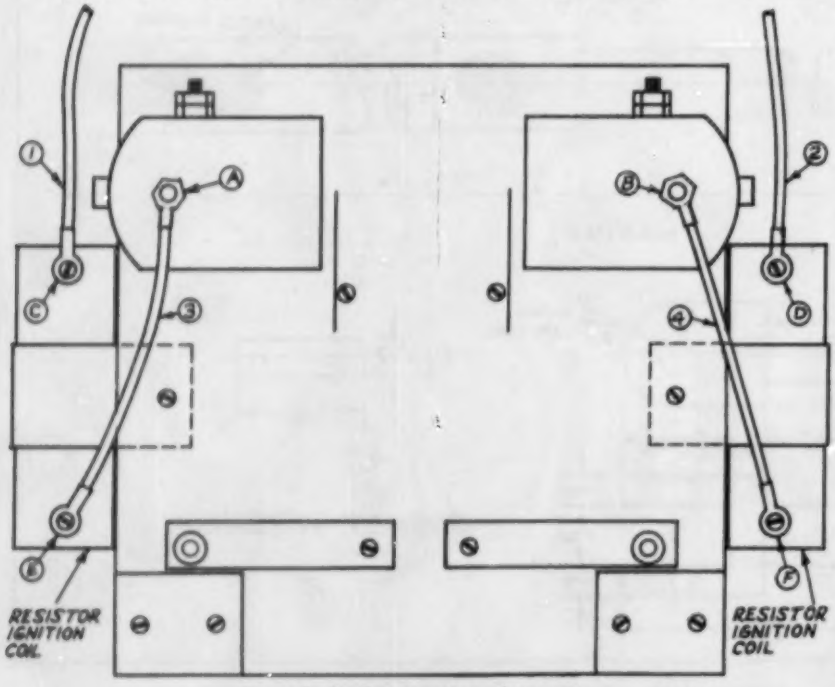
Head, Industrial Arts Department
Kansas State Teachers College
Emporia, Kans.

The electrical detonators designed for use on driver training cars having six-volt batteries will overheat and may burn out when used on twelve-volt systems. A simple modification makes it possible to use the old unit safely on twelve-volt systems, at a fraction of the cost of a new unit. Further, the modified unit could, if necessary, be re-converted for use on six volts by merely changing the position of two wires.

The modification consists of placing an ignition coil resistor, of the type used on 1955 and 1956 Chevrolets, in series with each of the solenoids on the detonator. The resistors may be mounted as shown in the accompanying sketch, by drilling two holes in the detonator base plate. The wires, numbers 1 and 2, are then moved from their original positions on terminals A and B, respectively, to the locations shown on the sketch. A jumper wire is then added to connect terminals A and E, and another is used to connect terminals B and F. The resistance of each circuit will then be sufficient to limit the current flow through each solenoid to approximately its original value.

Other improvements which may be made on the detonator are to provide a sure ground connection, and to install a fuse in the main feed line. The ground connection is needed because the detonator is supported on a wire bail, which may result in a momentary loss of ground contact on rough roads, causing both barrels of the detonator to fire prematurely. This can be prevented by fastening a wire, approximately twelve inches long, to the base plate of the detonator, with an alligator clip on the other end of the wire. Then, each time the detonator is mounted on the bumper of the car, the clip need only be fastened to the bumper to provide a reliable ground connection.

The fuse should be added, because it is usually most convenient to connect the detonator feed line directly to the battery cable or the starter switch, which provides no fuse protection. If, then, the insulation of the feed wire should become damaged, allowing the feed wire to come in contact with the car body or frame, the wire would immediately burn in two, possibly damaging the car finish, and perhaps starting a fire. This can be avoided by adding an *in-line* fuse of the type used in the supply wires used for automobile radios, direction signals, and other accessories. These *in-line* fuse units may be purchased at low cost from most automotive parts supply houses, and should be installed in the line as close as possible to the clip that is to be connected to the battery. A ten ampere fuse should be large enough to operate the detonator, and will still prevent damage to the wiring or the car.



Six-volt brake reaction detonator

MODEL SLEIGH

EDWARD GORAB

High School

Pompton Lakes, N. J.

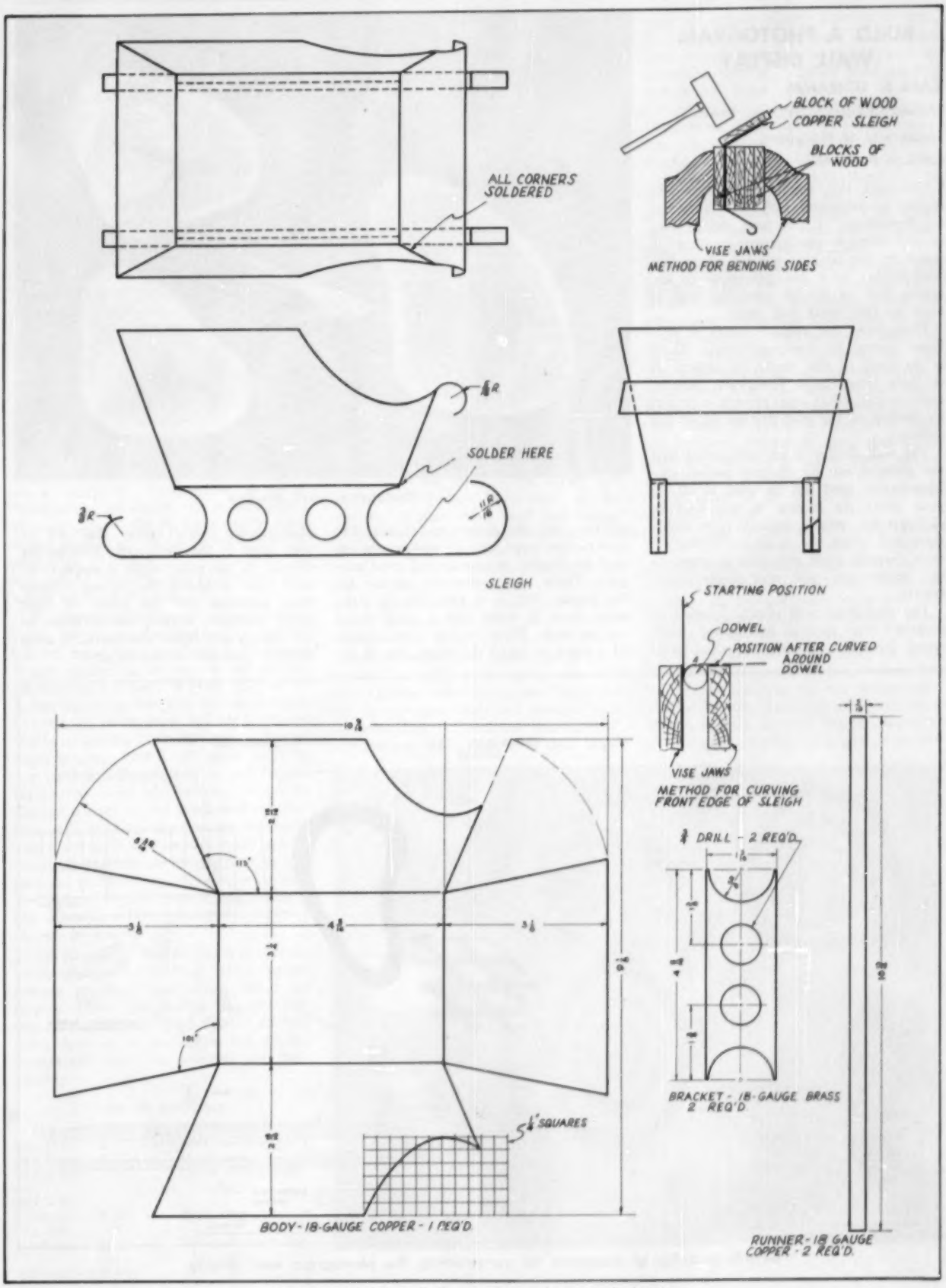
This metal sleigh was made for a florist who used it for a window decoration as a potted plant container, and the author has used it as a Christmas centerpiece. This should prove to be a popular project just before Christmas time for the sheet-metal shop. It includes the processes of cutting metal with tinsnips, jewelers' saw, and soldering.

For curving the front edge of the sleigh, clamp the end of the metal with a 5/16-in. dowel in a wood vise so as not to mark the metal. With a block of wood about ¼ in. thick and as long as the front edge, push against the metal to curve it around the dowel until the metal touches the top of the bench. The metal will then be curved about one fouth of the distance around the dowel. Loosen the vise and clamp the metal and dowel together at the point of tangency (point *A*) to curve metal still farther. Continue this until you get about three fourths of the way around the dowel.

To bend up sides of the sleigh, cut two pieces of wood ¾ in. thick the exact size of the bottom of the sleigh. Clamp one on each side of this center section and clamp in a large vise. With another piece of wood placed on the outside of the sides, bend them toward the center, one at a time. Tapping with a mallet against this block of wood will help give a sharper corner if desired. As the sides bend in toward each other, add blocks of wood on the inside so sides will clear jaws of vise as shown. Bring edges together and solder.

The outline of the runner brackets should be cut with a jewelers' saw. The ends of the runner can be curved around wood dowels of the required diameters.

The pieces then can all be soldered together, steel wooled, and then lacquered to prevent tarnishing.



Construction details for making the metal sleigh

BUILD A PHOTOGRAM WALL DISPLAY

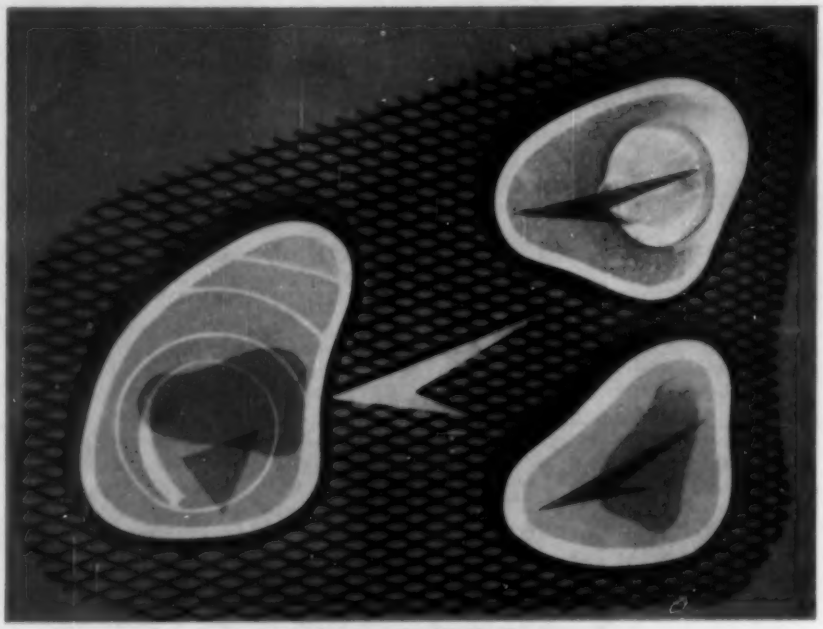
CARL S. SCHRAMM
Industrial Education Department
University of Maryland
College Park, Md.

Construct this unique photogram wall display to harmonize with your modernistic furnishings. A free-form design plus several original photograms combine to make an eye-catching project. Place this wall display in a den, playroom, or entrance hall to attract attention and to liven up that blank wall space.

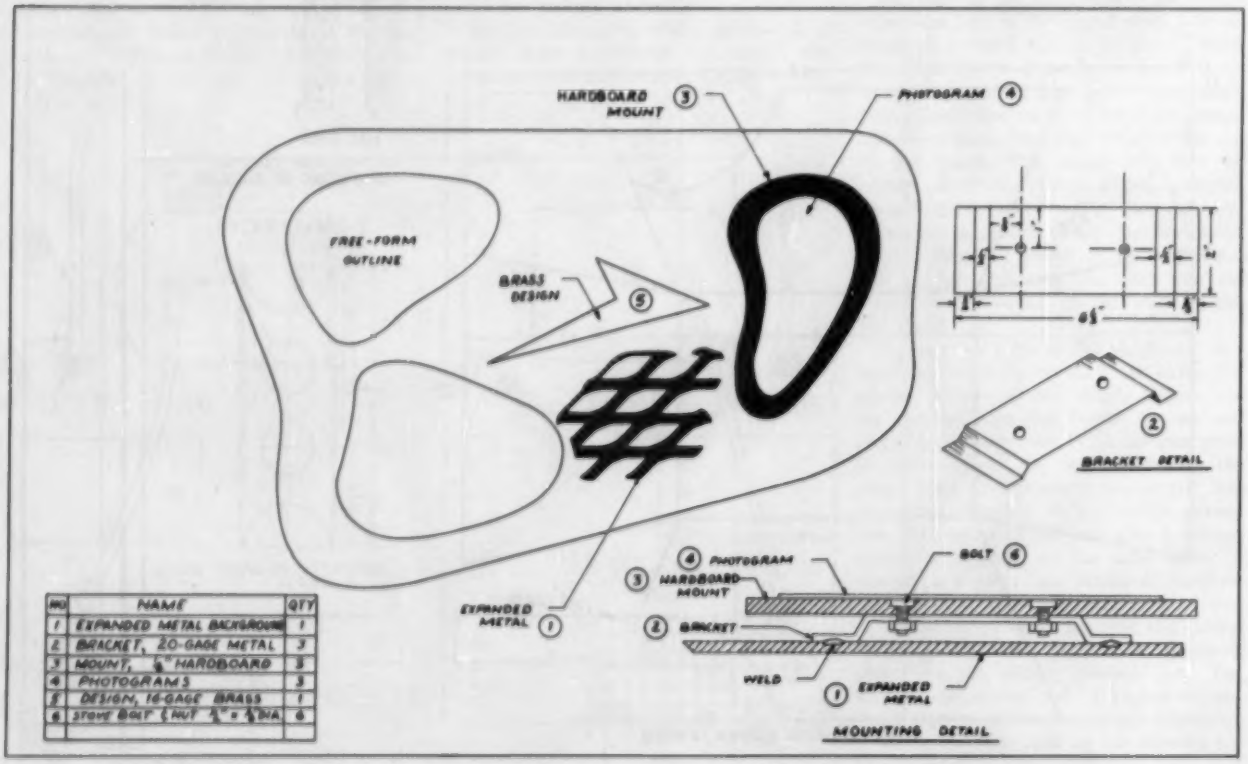
Photograms are contact prints of shadows formed by common objects. There is no limit to the choice of objects or to their arrangement. Glassware, jewelry, tools, or any object small enough to project its shadow on the photographic paper will suffice.

The wall display is so constructed that the pictures can be changed periodically. Photograms need not be used at all. If your skills are lacking in the field of photography, several cutouts from magazines will attain the same interesting effects. Several good snapshots enlarged to the proper size will also display your talents.

The photogram wall display consists of expanded steel sheet as background, hardboard free-forms as mounts, sheet-metal brackets, and photograms or pictures. The construction steps are: If photograms are used for display, choose several good subjects. Three photograms are needed for the display, but it is advisable to make many more in order that a good choice can be made. Place two or three objects on a piece of paper the exact size of the photographic contact paper that will be used later in the darkroom. Arrange the objects on the paper while a single overhead light is above the setting. Choose their positions for the effect of their group shadows. Record the positions of the objects and repeat the operation using different positions or new objects.



Photogram wall display



NO.	NAME	QTY
1	EXPANDED METAL BACKGROUND	1
2	BRACKET, 20-GAGE METAL	3
3	MOUNT, ¼" HARDBOARD	3
4	PHOTOGRAMS	3
5	DESIGN, 16-GAGE BRASS	1
6	STOVE BOLT (NUT ¼" x ¼" DIA	6

Details and list of materials for constructing the photogram wall dispay

In the darkroom set up the same conditions as before except substitute photographic contact paper for the blank paper. Of course, this action must be done under suitable darkroom lights. Expose the paper for the required time with an overhead white light. Develop the paper and repeat the operation using the new setting for the objects. Eight or ten photograms will be sufficient from which to choose three good examples. Make sure these photograms are of good quality and completely flat after drying.

Design a large free-form background out of wrapping paper. Choose a free-form expressing motion in one direction. Shape the three photograms to free-form contours harmonizing with the background. Cut out hardboard mounts having a margin of at least 2 in. larger than the photograms. The mount should follow the same pattern as the photogram that is to be placed on it.

Using the wrapping paper templet, cut out the background of expanded metal wire. Perforated aluminum sheet will serve as a substitute. Fashion the mounting brackets as shown on the accompanying drawing. Locate the positions of the hardboard mounts on the background material and mark. Place the mounting brackets in the middle of each marked position and solder or weld in place.

To further the feeling of motion, a sheet brass design may be attached to the expanded metal wire background. Fashion a design similar to the one shown on the drawing from a piece of brass 4 by 10 in. Solder the brass design to the background.

Paint all metal parts flat black, except the brass design. Give the brass a coat of clear lacquer. Attach the small bolts to the hardboard mounts, two on each mount. Recess the heads of the bolts flush with the top surface of the hardboard and glue into position. After the glue has hardened, fasten the hardboard mounts to the mounting brackets. Glue the photograms or pictures to the hardboard mounts using rubber cement. Rubber cement will facilitate the removal of the photograms when a change is desired.

The photogram wall display is now ready to be mounted on the wall. Use a regular picture mounting bracket to hang the display. Give this display the attention that you would any good framed picture. From there on the photogram wall display will reflect your own interests and personality.

BILL OF MATERIALS

Size	*Cost*	*Quan.*	*Material*
18 x 24 in.	$ .50	1	Wire, steel sheet
8 x 10 in.	$ .25	3	Hardboard
8 x 10 in.	$ .30	3	Paper, photographic (contact)
4 x 10 in. 16-ga.	$ .35	1	Brass, sheet
2 x 16 in. 20-ga.	$ .10	3	Tin, sheet (mounting brackets)
Total Cost	$1.50		

COLONIAL LOUVERED HUTCH

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Shown in this article is an example of Colonial hutch design utilizing the present-day interest toward louvered doors and shutters. This style of furniture lends itself more readily for duplication by students than many others due to its basically simple line design and construction.

Construction of the hutch as shown here should be as follows, although changes such as pine instead of maple and using nails instead of screws and plugs could be made easily. The same applies to construction methods which the reader may wish to alter.

Begin by laying out the side pieces, band saw to shape, dado for main shelf, rabbet for ¼-in. back, rasp, and sand edges to *round* for Colonial effect. Lay out and cut bottom, main shelf, middle, and top. Rabbet main shelf and bottom to take back piece. Round front edges of all three, groove middle and top ¼ by 5/16 in. Distance of groove from back will vary according to distance of hutch to wall due to baseboard. Average from back should be about 1¼ in. Counterbore and drill for No. 8 by 1¼ in. f.h. screws.

Lay out main shelf *notch lap* at front corners carefully, ½-in. radius on outer curve. Preliminary assembly may be carried out by screening sides and shelves, without glue. Lay out and cut two stiles *F*, counterbore, drill, rasp, and sand upper ends to make smooth joint with sides. This is a most important joint, hence, glue is not used yet so pieces may be placed in vise to facilitate final sanding and fitting. Screw pieces *F* in place and lay out upper and lower rails for tenoning. Dimensions given are for 1½-in. tenon. Lay rails (one end tenoned) between pieces *F* and mark off for other tenon, 1/64 in. longer for a tight fit. Cut lower rail to shape and sand. Lay out center bar, mortise and tenon accordingly. Drill upper rail, two holes, 10 in. from end for screws into lower side of middle shelf.

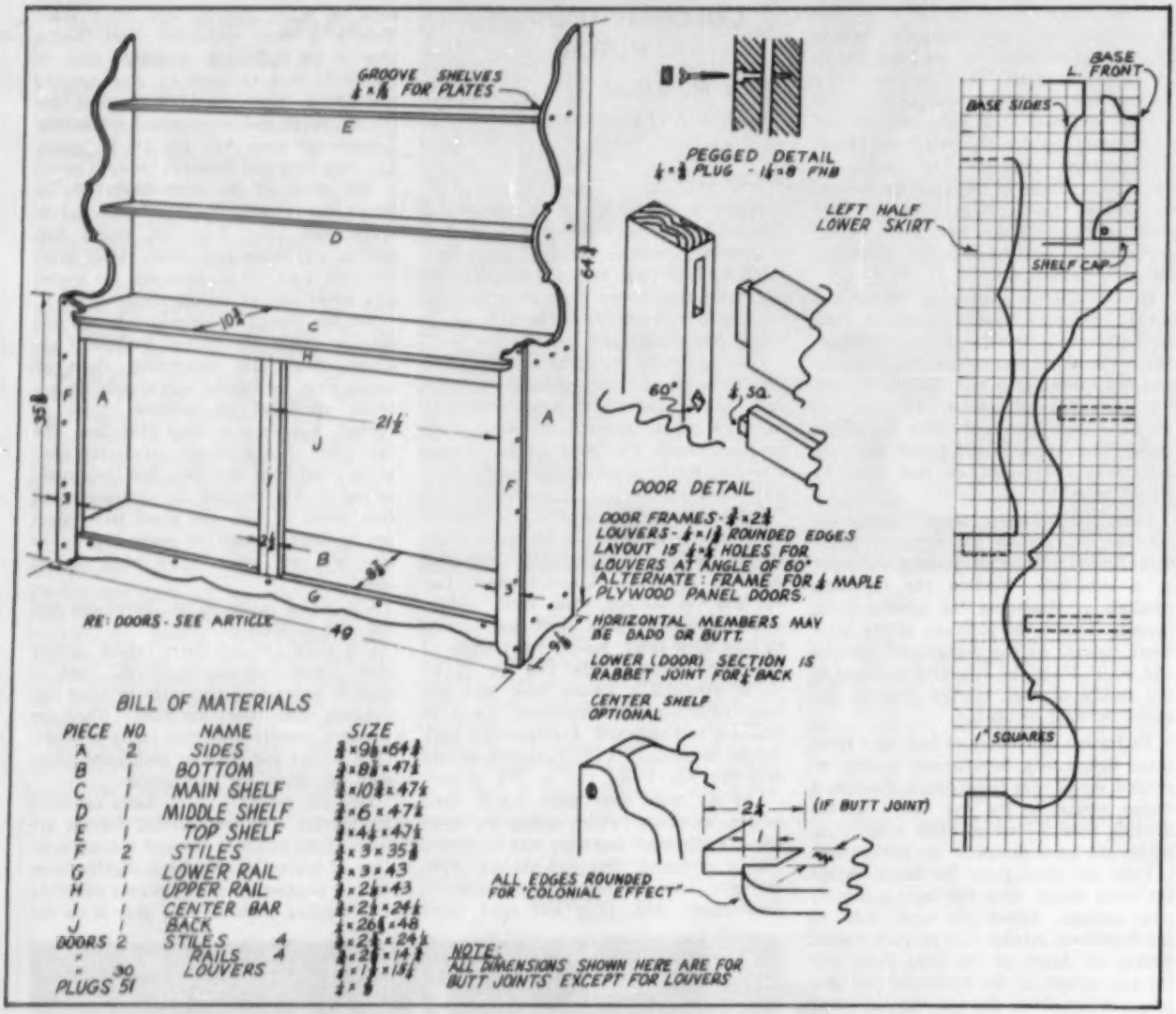
Set bar clamps to necessary length and prepare joints for gluing. Tighten f.h.b. screws, check for squareness, clean off excess glue. Be careful screwheads do not touch edges of counterbored holes so "plugs" will show a clean glue line. The two upper shelves do not necessarily need to be glued in at this time, but they could be put in *dry*, checked for squareness and then glued. If not, and glued later, sides are resilient enough to open slightly so glue will not touch sides when set in place.

Cut plugs, ¼ by 3/8 in., bevel one end and glue in place.

Cut stock for two doors (check against both frame openings — 25 in. high is slightly larger than necessary to allow for squaring when doors are hung). They are standard mortise-and-tenon joints with two f.h.b. screws and plugs at each joint, using eight per door, see photograph.

Lay out for 15 — ¼-in. holes on stiles for louvers. Top and bottom louvers are 1/16 in. from touching top and bottom rails. Tips of louvers should be a slightly loose fit into mortise on stiles because assembly is a juggling problem once glue is on the

Louvered hutch



BILL OF MATERIALS

PIECE	NO.	NAME	SIZE
A	2	SIDES	¾ × 9½ × 64¼
B	1	BOTTOM	¾ × 8⅜ × 47¼
C	1	MAIN SHELF	¾ × 10⅜ × 47¼
D	1	MIDDLE SHELF	¾ × 6 × 47¼
E	1	TOP SHELF	¾ × 4¼ × 47¼
F	2	STILES	¾ × 3 × 35⅜
G	1	LOWER RAIL	¾ × 3 × 43
H	1	UPPER RAIL	¾ × 2½ × 43
I	1	CENTER BAR	¾ × 2½ × 24¼
J	1	BACK	¼ × 26½ × 48
DOORS	2	STILES	4 ¾ × 2¼ × 24½
"		RAILS	4 ¾ × 2¼ × 14½
"	30	LOUVERS	¼ × 1⅜ × 13¼
PLUGS	51		¼ × ⅜

NOTE: ALL DIMENSIONS SHOWN HERE ARE FOR BUTT JOINTS EXCEPT FOR LOUVERS

Detailed drawing and bill of materials for constructing the louvered hutch

frame joints. Do not glue louvers in place. A 60-deg. angle was used on hutch shown here, but fewer louvers can be used with higher angle. Back for lower section (behind doors) can be ¼-in. plywood or masonite. Center shelf for the lower section is also an alternate.

Finish used was maple oil stain with three coats of shellac and alcohol (half and half) steel wooled between coats and paste waxed. Hardware is standard forged black iron. Strap hinges are 7½ in. over all, thumb latches at center of each door.

Porcelain finish that looks like copper has been developed by Pemco Corp., Baltimore. The maker says one firing of the new Coppertan finish, applied to a steel surface, gives surface that won't tarnish or scratch. — *Industrial Research Newsletter.*

MAKE A TUMBLER FOR YOUR CRAFT ROOM

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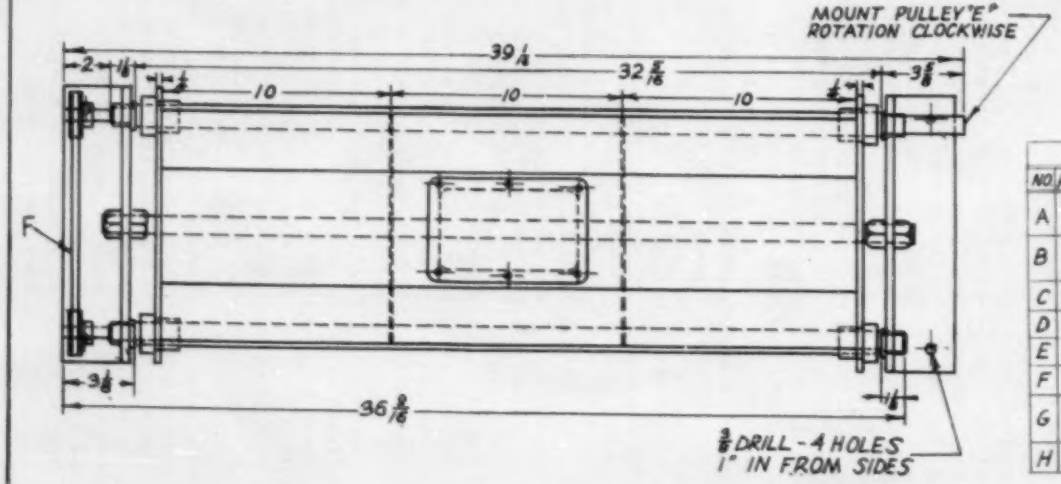
Building a tumbler serves two purposes in a school. It provides a good project for a sheet-metal class or a machine shop class, and it also provides the craft department or club with an inexpensive tumbler. The second purpose is the most important one, as students can polish their own stones which they find on rock hunting trips. This adds to the fun of a craft club, as the members can do all the work themselves and save the money it would cost to have the gems polished.

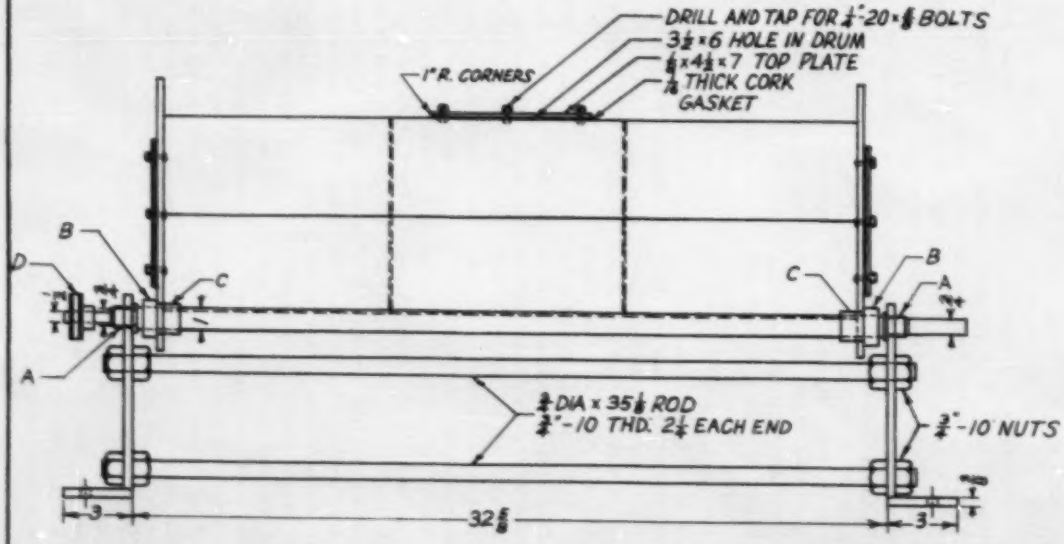
One of the outstanding features of this gem stone tumbler is that it has three compartments for tumbling. With this arrangement it is possible to tumble small batches of similar stones instead of mixing them all together in one compartment. Another feature of this tumbler is that several batches of stones can be in different phases of the tumbling process at the same time. Take for example, when the first batch is done in the rough tumbling process this batch can be transferred to the second compartment and a new batch started.

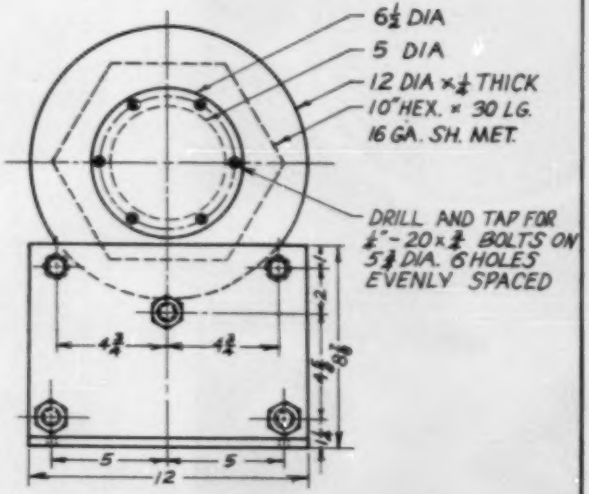
The design and construction of the tumbler is such that it can allow for changes which the builder would like to make himself. In this way it may be pos-



BILL OF MATERIALS

NO	PCS	NAME OF PART	SIZE	MATERIAL
A	4	BEARING	.752 I.D. .940 O.D. 1" LG & FLG. T. 1.188 FLG. O.D.	BRONZE
B	4	SETSCREW COLLAR	1" I.D. 1 1/8 O.D. 3/8 WIDE 5/16 x 5/16 SETSCREW	STEEL
C	4	TUBING	1 1/8 O.D. 1" I.D. x 1" LG.	NYLON
D	2	PULLEY FOR 5/16 RD. BELT	2 DIA. 1/2 HOLE DIA.	
E	1	PULLEY FOR 3/8 RD. BELT	12 DIA. 3/4 HOLE DIA.	
F	1	BELT	5/16 RD. x 25 1/4 LG.	
G	1	PULLEY FOR 3/8 RD. BELT FOR 1/4 - 1/3 H.P. MOTOR - 1750 R.P.M.	2 DIA. 1/2 HOLE DIA.	
H	1	BELT	3/8 RD. x 60 LG.	





Details and list of materials for constructing the tumbler

The tumbler ready for operation

sible to use parts which he already has on hand. The cost of the tumbler as shown on the blueprint was about $22, as most of the parts were made rather than purchased. (This cost does not include the motor.)

The actual construction of the tumbler should begin with the base or support for the drum itself. The first step is to cut the ends for the base from a ¼-in. steel plate. If you do not have the proper facilities for cutting this plate you should have it cut in a machine shop or welding shop. (It would also be advisable to have the parts for the drum cut out at the same time.) After the ends have been cut to size, two $^{15}/_{16}$-in. holes for the bronze bearings, three ¾-in. holes for the support rods, and four ⅜-in. holes in the small pieces for the mountings should be drilled. The ends should be welded together and the bronze bearings inserted. The $^{15}/_{16}$-in. holes will provide for a .0025 in. force fit which will hold the bearings.

The three support rods are cut from ¾-in. D. cold rolled steel and threaded about 2½ in. on each end with a ¾ — 10 N.C. die. The two drive rods are made from 1-in. D. C.R.S. and are turned down on the ends to the specified sizes. Care should be taken so that the bearing surface of the rod does not exceed .750 in. so that the proper .002 in. clearance is maintained between the bearing and the shaft.

The steel setscrew collars (B) can be purchased or made if the equipment is available. If they are made, it would be advisable to increase the diameter from 1⅝ in. to 2 in. so that a thicker side wall of ¼ in. nylon could be used instead of the ⅛ in. The nylon tubing, *C*, and bronze bearings *A* can be purchased at most machinery or bearing companies.

The base should be assembled as shown in the working drawing, and adjustment of the nuts on the three support rods should be made so that the two drive rods will turn freely. The 12-in. D. pulley *E* should be mounted on the ¾-in. D. end of the drive rod and the two 2-in. D. pulleys *D* on the other end of the drive rods. A $^{5}/_{16}$-in. round belt is placed over the two 2-in. D. pulleys in order to power the second drive rod. This became necessary when the nylon drivers were used instead of rubber, for the nylon provides less traction.

The base should be mounted on a bench or a piece of ¾ by 20 by 48-in. plywood. A ⅓ to ½ h.p. motor should be next mounted on the plywood in such a way that the top of the drive rod will rotate away from the center of the base. A good way to mount the motor is to hinge it so that its weight will keep the belt tight at all times.

The next major part of the tumbler is the construction of the drum. This should be started by cutting the two 12-in. D. ends out of ¼-in. steel plate. The inside 5-in. D. hole should also be cut at this time. When cutting this out enough material should be left for turning the ring down to the required sizes if a smooth edge is not obtained when cutting them out. The rings can best be made round by turning on a lathe in a four-jaw chuck. After this is done, five equally spaced holes should be drilled and tapped with a ¼ — 20 tap on a 5¾-in. D. circle. Five ¼ — 20 × ¾-in. bolts should be screwed in, in such a way that the heads will be on the inside of the drum when it is welded up. After this is completed the 6½-in. D. end covers should be cut out of 16-ga. sheet iron. A gasket made of $^{1}/_{16}$-in. sheet cork should be glued to the cover to form a water tight seal with the end. Five $^{5}/_{16}$-in. equally spaced holes on a 5¾-in. D. circle should be drilled in the covers to allow for the bolts to stick through. Wingnuts can be used instead of regular nuts to aid in removing the cover.

The next part of the drum is the forming of the hexagon. This is made out of a piece of 16-ga. sheet iron, 30 by 30½-in. The ½ was added to form an overlap for joining the edges. The hexagon is formed into shape by bending 5 by 30-in. rectangles at 60-deg. angles to each other until all six sides have been formed. After the hexagon has been formed, it should be brazed on the inside to make it watertight.

Two hexagons which will just fit inside the one just made should be cut from the 16-ga. sheet metal and brazed into the center section so that three 10-in. compartments are formed. The hole in the outside of the center compartment should be cut 3½ by 6 in. with a 1-in. radius at the corners. Six holes for ¼ — 20 threads should be drilled and tapped on a 4 by 6½-in. rectangle as shown in the detail drawing. The tap cover or plate should be cut 4½ by 7-in. from 16-ga. sheet metal and have corresponding $^{5}/_{16}$-in. holes drilled in it. A $^{1}/_{16}$-in. thick cork gasket should be glued on the cover to provide a watertight seal.

The last step in building the tumbler is the brazing of the two ends on the hexagon tank. This is a very important part for if the tank is not properly centered on the ends it will wobble and not tumble the stones properly. If a spot welder is available, small metal tabs can be tacked on the drum and end plates which will aid in holding and brazing them together.

When the drum is finished it should be placed on the nylon drive pads. The steel setscrew collars should be adjusted so that there is about ⅛ in. of play between the over-all length of the drum and the collars. When this is done you are ready for the trial run. The drum will rotate at about 30 r.p.m., which is a good average for different loads. The amount of the load will determine the correct r.p.m., but it is not too critical. When it is loaded with stones they should have a swishing effect for maximum results.

The tumbler which is shown here has not been in operation very long, so as a result we are still experimenting as to the types of charges which should be used with the stones. Some of the results of our findings are:

1. *Rough tumbling* — Use about 5 lb. of rocks and about 1 lb. of grit or 10 per cent of the weight of the stones. (Up to 10 lb. of stones can be used in any one compartment provided the total load does not exceed 20 lb.) Silicon carbide of No. 120 grit should be used for average stones, and No. 80 grit is good for very rough rocks. Add enough water to cover the stones and abrasive. Tumble for about 50 hours and check to see how much more tumbling is needed, if any.

2. *Second tumbling* — Use about 1 lb. of No. 220 grit silicon carbide or 10 per cent of the weight of the rocks. Cover with water and tumble. There is no definite length that they should be tumbled, as it will vary with the different rocks.

3. *Polishing* — This is the last phase of tumbling and is practically unlimited as to what can be used. Anything from Tide to cube sugar has been suggested, but we are using small scraps of leather, corn syrup, and water. We are also experimenting with soybean hull flour as a possible polishing agent, but have not reached any definite conclusions yet.

We are still experimenting with our tumbler so it is without a doubt that you will find many more possibilities as you experiment with yours.

GUIDE FOR OFFSET PRESS OPERATION

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Lithography has been something of a poor relative in industrial-arts printing shops in the past. Generally the pupil's acquaintanceship with this form of printing consisted primarily of a short information unit on the subject. However, with the advent of the current office model offset machines, the lithograph is taking its place beside the letter press in many school shops.

Suitable reference material, unfortunately, is not abundant. As a solution to the local problem the following guide was prepared as an operation reference for the beginning pupil.

The material was necessarily orientated to the particular make of press used in our shop. However, with minor alterations, the procedures listed could be used with other machines of comparable size.

The What, When, and Where of Lithography

If you think "Lithography" is Greek to you, then you are absolutely correct. Translated and interpreted it comes out: Lithos (meaning *stone*) and graphein (meaning *to write*) = stone writing. Originally, writing on stone was the actual process used. One Herr Senefelder of Munich, a playwright by trade, discovered in 1796 that if he wrote on a flat stone with a greasy material and then moistened the stone he could then apply an oil base ink to the surface with the result that the ink would adhere only to the greasy

Fig. 1. Principle of the stone lithograph process

impressions. It was a simple matter, at that point, to transfer the ink to paper by placing a sheet over the stone and applying pressure. Hence, the principle behind the lithographic process is simply "grease and water do not mix."

In the period 1881–1906 the grandfather of our present-day lithograph, the *offset* press was developed. The distinguishing characteristic of the machine is the three

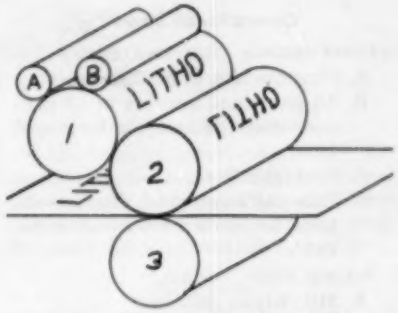


Fig. 2. The three cylinder form of the lithograph machine

1. Master cylinder
2. Blanket cylinder
3. Impression cylinder
A. Ink roller
B. Water roller

cylinder assembly. Irrespective of the size of the machine every offset press can be recognized by the presence of the three cylinders.

The basic parts still correspond to the original stone writing. The addition of the blanket and impression cylinders was made for convenience' sake. In the original form the image was written as a negative so that the transferred impression could be read as a positive. On our modern machines the blanket cylinder acts as a middle man and we have this situation: Mat cylinder = positive — blanket cylinder = negative — paper = positive.

With this system one may draw, print, or type directly on the mats without taking the trouble to reverse the image.

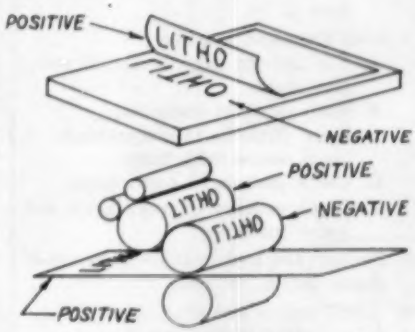


Fig. 3. Comparing the stone method to offset method

The Application of Lithography (offset)

In recent years the use of offset printing has risen disproportionately compared with other printing methods. The primary reason being that the mat (image surface) can be so simply prepared in a variety of ways yet results can be comparable to letter press and graven work. Some common offset products are: signs, labels, books in color, pamphlets, business forms, shoppers, and flyers. Many business firms now operate offset machines as part of their office equipment. In commercial printing shops lithography has long been a standard method.

Here are some advantages of the offset process:

1. Good for relatively short runs with color.
2. Easy reproduction of existing materials.
3. Well adapted to art work direct to mats; excellent for vignettes and stipples.
4. Brief machine preparation.
5. Simple and economical mat storage.
6. Easy job on ruled work.
7. Half tone can be printed on rough paper.

Mat and Impression Materials

Mats

Figure 4 gives a brief description of the common mats available for office type offset machine.

Selection of a particular type of mat will, of course, be governed by the nature of the material to be reproduced. If only a few copies are required, one would select a short run mat. For general reproduction of photographed material the sensitized paper mat would be used.

Impression Materials

In line with the original principle of the process we recognize that the impression material must repel water and attract grease. Therefore, the common lead pencil and water base paints will prove unsatisfactory for mat work. It is recommended that the special series of lithographic pencils, inks, crayons, and typewriter ribbons be used although one may improvise with common crayon or grease pencil for short runs. Corrections may be made with special erasers. For layout and

Fig. 4. Common mats available for Multigraph 1250

Mat Types	*Approx. Mat Copy*	*Recom. Reruns*	*Approx. Price*	*Impression Material*
Short run paper (yellow)	200	1	.07	Lithographic pencils, crayon, ink, typewriter ribbons
Medium paper (blue)	750	1	.10	Same
Long paper (buff)	2000	1	.17	Same
Sensitized paper	3000	1	.34	Impression made by photographic negative
Aluminum	5000+	Several	.50	Same

proofing one should use the non-reproducing pencil.

Controls — Multigraph 1250

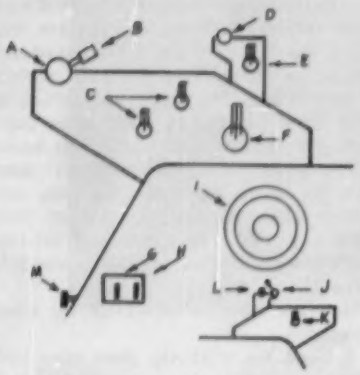


Fig. 5. Operator's side of the machine

A — Ink Fountain Roller Knob
B — Ink Feed Lever (Ratchet Control)
C — Form Roller Levers
D — Water Fountain Roller Knob
E — Water Form Roller Lever
F — Operating Control Lever
G — Machine Switch
H — Paper Feed Switch
I — Hand Wheel
J — Water Feed Lever (Ratchet Control)
K — Lower Form Roller Lever
L — Contact Lever
M — Speed Control Knob

Roller Assembly — Multigraph 1250

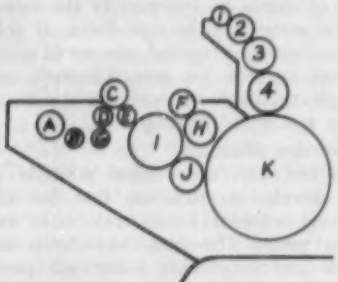


Fig. 6. Roller assembly

Ink

A — Fountain Roller
B — Ductor Roller
C — Upper Oscillator
D — 1st Idler
E — 2nd Idler
F — 3rd Idler
G — Fixed Distributor
H — Upper Form
I — Vibrator
J — Lower Form
K — Master Cylinder

Water

1 — Fountain Roller
2 — Ductor Roller
3 — Rider Roller
4 — Form Roller

Operational Steps

1. Check controls (Pre-check).
   - A. Clear machine of obstruction.
   - B. All levers and switches in *off* position (there are ten on the model 1250).
   - C. Feed table down.
   - D. Turn the hand wheel three revolutions to check freedom of movement.
2. Prepare water fountain.
   - A. Mix Replex solution:
     ML inks — 1 oz. Replex to 7 oz. distilled water.
     MLS inks — ¼ oz. Replex to 7¾ oz. distilled water.
   - B. Place bottle in position.
   - C. Wet water fountain rollers — set water feed lever on full, move contact lever toward fountain, start machine and run-in until water rollers are wet. The process may be hurried by manually turning the water fountain roller knob.
   - D. Turn off the machine and set water feed lever at ½.
3. Ink the machine.
   - A. Place ink in fountain — ink should roll to the approximate diameter of a pencil.
   - B. Place lower form roller lever in horizontal position.
   - C. Place ink feed lever on full.
   - D. Turn on machine and run-in until the ink is distributed. The process may be hurried by manually turning the ink fountain roller knob.
   - E. Turn off machine and set ink feed lever at ½.
4. Load the paper magazine.
   - A. Fan and jog paper — discard wrinkled sheets.
   - B. Place paper in magazine.
   - C. Raise magazine to proper height — 1/16 in. below brass finger.
   - D. Check position of paper stops.
   - E. Check position of paper guide and jogger guide.
5. Playtex prepared mat — cover thoroughly but do not rub.
6. Attach mat to master cylinder.
7. Proof the mat.
   - A. Start the machine.
   - B. Engage ink rollers (ink form roller levers to horizontal).
   - C. Engage water roller (water form roller lever to horizontal).
   - D. Disengage ink rollers (ink form roller levers to vertical).
   - E. Disengage water roller (water form roller lever to vertical).
   - F. Turn off machine.
   - G. Playtex dirty spots on mat.
   - H. Check blanket for cleanliness.
   - I. If correction is necessary, remove mat, check controls as in item 1 and make correction. Follow above procedure for second proof.
8. Run a proof copy.
   - A. Start machine (set speed control on slow).
   - B. Engage water roller (lever to horizontal).
   - C. Engage ink rollers (levers to horizontal).
   - D. Turn on paper feed switch and turn operating control lever to horizontal position.
   - E. Run three copies — turn off operating control lever and paper feed switch.
   - F. Disengage ink rollers.
   - G. Disengage water roller.
   - H. Turn off machine.
   - I. Check third copy for ink quality and centering of text. Refer to the Trouble Sheet and the appropriate Special Adjustment Sheet for diagnosis and adjustment procedure if necessary. (Have copy approved by the instructor before making adjustments.)
   - J. Proceed through sub-steps 8-*A* — 8-*I* until satisfactory results are obtained.
   - K. Set counter to zero and follow sub-steps 8-*A* to 8-*D* in making the desired number of copies. (Speed may be turned up to an appropriate rate at this point.)
   - L. If the mat is to be saved for future runs, it should be *run down* at the end of the run by turning off the ink and water and letting the mat clear itself of ink on an additional ten or twelve copies.
   - M. Shut down the machine — sub-steps 8-*F* to 8-*H*.

Maintenance Steps

1. Cleaning the machine after a run.
   - A. Place ink fountain and water fountain feed levers in off position.
   - B. Remove paper from machine.
   - C. Remove mat.
   - D. Clean out catcher pan.
2. Remove Replex bottle.
3. Clean off blanket with Blankrola.
4. Clean ink fountain.
   - A. Remove fountain from machine.
   - B. Discard old ink and clean fountain with Blankrola.
5. Clean ink rollers.
   - A. Clean ink fountain rolled with Blankrola (be sure the fountain ink feed lever is *off*).
   - B. Remove ductor roller and clean it.
   - C. Turn on machine and engage ink roller cleaning device by tightening knurled knobs until blade rubs snugly against oscillating roller.
   - D. Apply Blankrola (with oil can) to vibrator roller. Continue moderate application until rollers appear clean.
   - E. Disengage roller cleaning device.
   - F. Turn off the machine.
   - G. Replace ductor roller and ink fountain.

H. Turn vibrator roller lever to vertical position.

6. General
   A. Wipe off any ink smears on body of machine (use rag dampened with Blankrola).
   B. Set counter to *0*.
   C. Replace all tools, ink cans, solutions, etc.
   D. Dispose of dirty pads and rags.
   E. Clean out roller cleaning device as indicated by the maintenance chart.
7. Lubrication
   A. The printing shop foreman and the instructor will oil the multilith on the days specified on the maintenance chart.
   B. Place two drops of oil (use only specified oil) in each oil hole. Wipe off excess. —— oil holes.
   C. Check oil level in vacuum pump. Add as necessary.
8. Final check list.
   A. All levers and switches *off*.
   B. Fountains clean.
   C. Rollers clean.
   D. Machine wiped off.
   E. Tools and materials stored.
   F. Machine covered.

BEDROOM LAMPS

NICHOLAS M. GUILIANO
Industrial Arts Instructor
Wicomico Senior High School
Salisbury, Md.

Materials Needed

No. of Pcs.	*Material*	*Size*
6	Glass ash trays	(either square or round — 2 sets of 3)
1	Brass tubing	¾ in. O.D. 13 in. long
1	Stock,(maple, walnut, or cherry)	3 x 3 x 8 in.
1	All-threaded pipe	⅛ x 23½ in. long
2	Sockets	
2	Plugs	
12 ft.	Parallel lamp cord (preferably rubber covered cord)	
4	Washers and nuts	⅛ in.

Bedroom lamps

Tools and Equipment

Wood lathe, hack saw, rule, scriber, 7/16-in. auger bit and brace. Old three cornered file ground for boring glass, turpentine which should be used as a cutting fluid. Necessary finishing materials.

Procedure

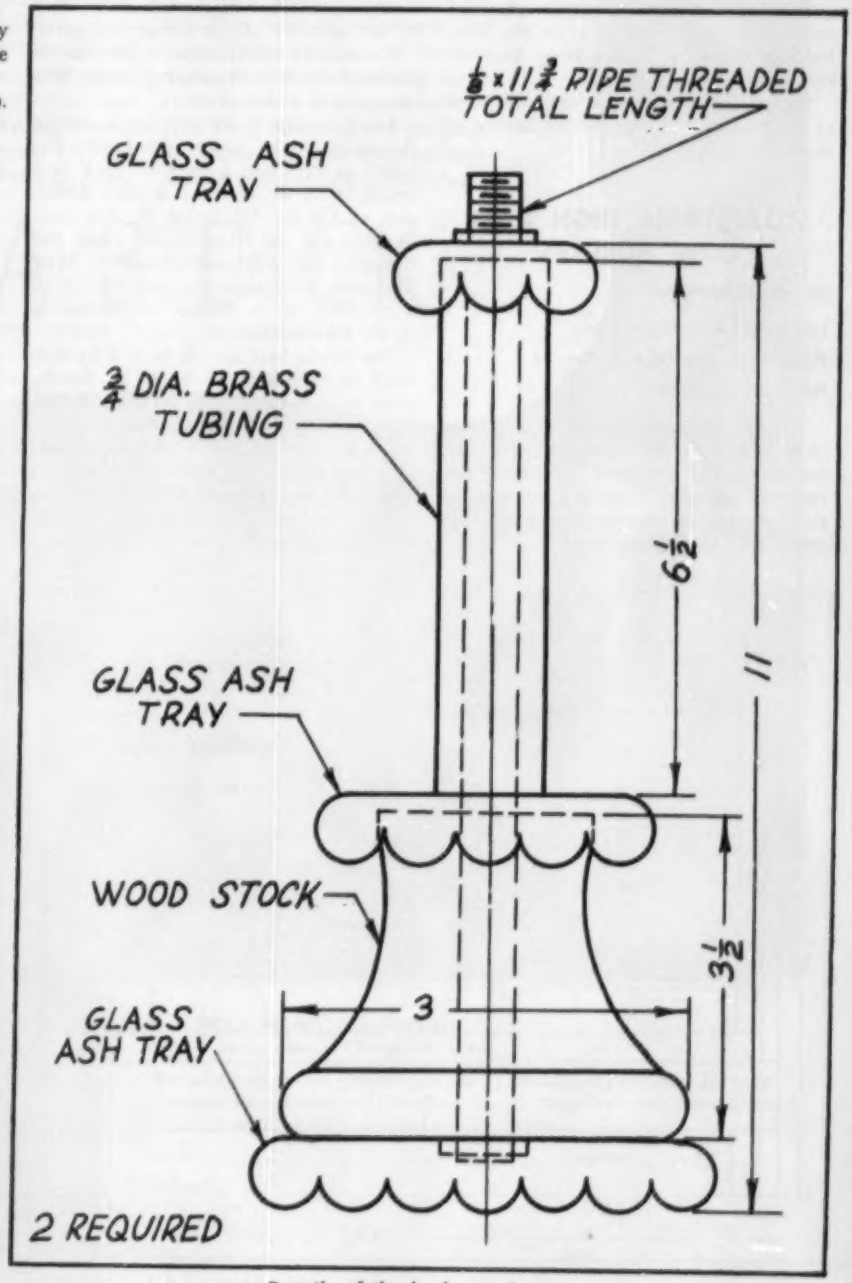
1. Center stock on the wood lathe and turn stock to desired shape. If square ash trays are used, the wooden base ought to be cut into the shape of a frustum of a square pyramid. Be sure to follow your template so that both pieces are alike.

2. Bore hole through stock using a No. 7 auger bit.

3. Cut the turned stock, separating each piece and apply a shellac or varnish finish.

4. Cut two pieces of brass tubing 6½ in. long, square the ends with a file.

5. Buff the brass tubing using tripoli wheel first and follow up with rouge. Wash in hot water with soap and then apply a coat of lacquer.



Details of the bedroom lamp

6. Boring the holes in the glass is somewhat tricky and requires a bit of patience. Grind the tip of an old file to spear point. Be sure to use a 3-corner file to bore the hole, and *use plenty of turpentine.* The turpentine will lessen the chances of ash trays breaking or cracking during the process of drilling holes as so much heat is generated by file.

7. When all these operations are completed, insert the all thread pipe through the ash trays, the wood, and the brass tubing.

8. Tighten the pieces in place and fasten with washer and nut on the top and bottom.

9. Insert the wire through the pipe and attach the socket and plug to the wire. Be sure to tie an underwriters knot on both ends.

Suggestion: Lamp shades that are flared at the bottom will enhance the beauty of these lamps.

ADJUSTABLE HIGH AND LOW HURDLES

W. D. TOMPSON
Industrial Arts Instructor
Public Schools, District No. 14
Hot Springs, Mont.

This hurdle meets official specifications as to height on high and low, minimum bar length and minimum bar width. The required eight lbs. turning force may be met by adjusting the tension of the nuts which hold the turning bars.

During the course of a school year the high school industrial-arts instructor is likely to be called upon to perform a number of duties not necessarily connected with regular instruction, and frequently these projects require considerable study, time, and work.

When we were called upon by the athletic department to construct twenty adjustable hurdles for the track team it appeared at first to be a rather big job, but as it turned out, all work on the hurdles was done by students during their free periods and with a minimum of supervision. The only work required of the instructor was in planning and the construction of three jigs which were used in the assembly of the component parts.

For ease of construction, stock sizes of lumber were used whenever possible. This proved to be a time saver.

The first step in construction is cutting the parts to the proper dimension. The bases are cut from 2 by 4-in. stock to a length of 18 in., giving a finished dimension of 1⅝ by 3⅝ by 18 in. The main uprights are cut from ¾-in. stock and ripped to 3-in. width and a length of 30 in. The main crosspieces are cut from 1 by 4-in. stock, to a finished dimension of ¼ by 3¼ by 44¼ in.

The hurdle bars are cut from 1 by 4-in. stock to a finished ¾ by 42 in. Regulations require that hurdle bars be a minimum of 42 in. in length and 3 in. in width. The swinging uprights which connect the two hurdle bars are also cut from 1 by 4-in. stock to a finished ¾ by 3 by 21 in.

The main uprights and swinging uprights are now drilled with a ¼-in. drill at a point located 6 in. from one end and centrally from either side. At this time the corners should be cut off as indicated in the illustration.

The swinging uprights must now have a groove cut on both ends, ¾ in. wide and 3 in. long. These grooves are to accept the hurdle bars which should fit tight. A dado head proved to be the best tool for making these cuts.

At this point assembly may begin. A jig should be constructed so that the bases and main uprights may be assembled in the form of a *T*. These joints should be nailed and glued.

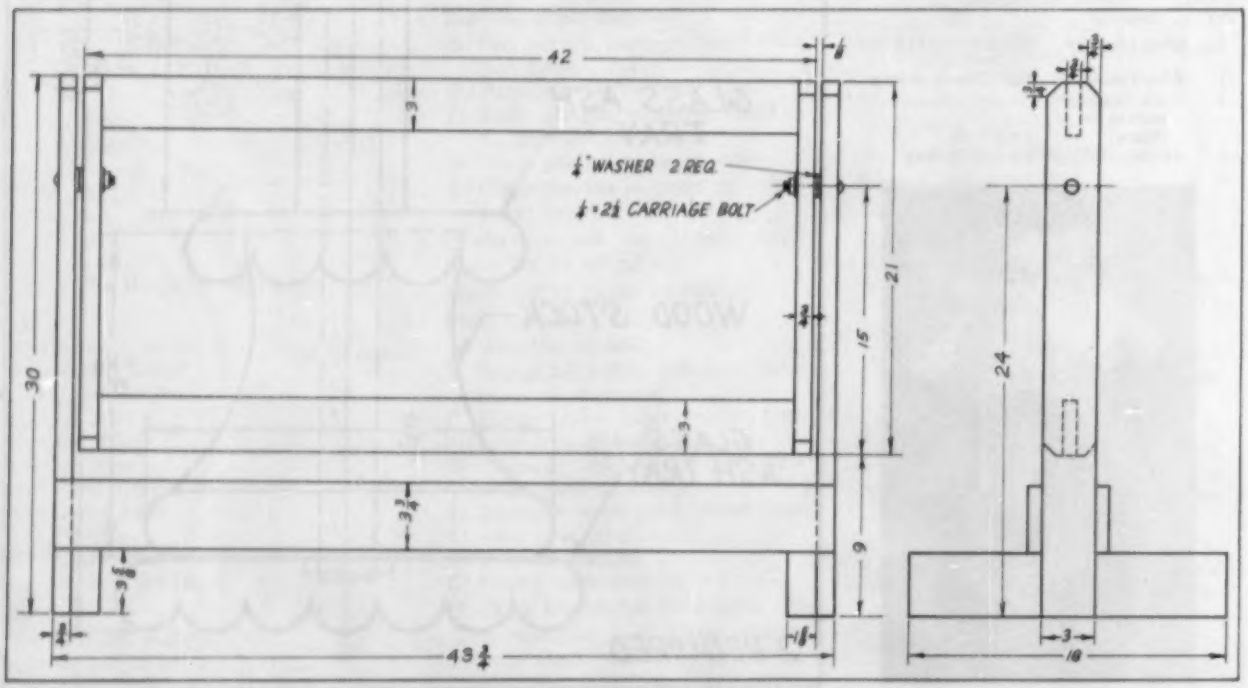
When all the *T's* are completed, another jig should be made so that two *T's* may be joined together by two main cross braces. These also should be glued and nailed.

Now a final jig should be made so that the hurdle bars and the swinging uprights may be assembled. Again the joints should be glued and nailed.

The final assembly is done by inserting ¼ by 2½-in. carriage bolts into the holes that have already been drilled for them. The main upright and the swinging upright are separated by two ¼-in. washers to insure a free swing. Wing nuts may be used so that tension adjustment may be made without the use of tools. After the nuts are in place the end threads on the carriage bolt should be peened over with a pair of pliers or wire cutters so that the nuts will not be accidentally lost.

Paint should be white exterior, preceded by treatment with a wood preservative.

(Continued on page 12A)



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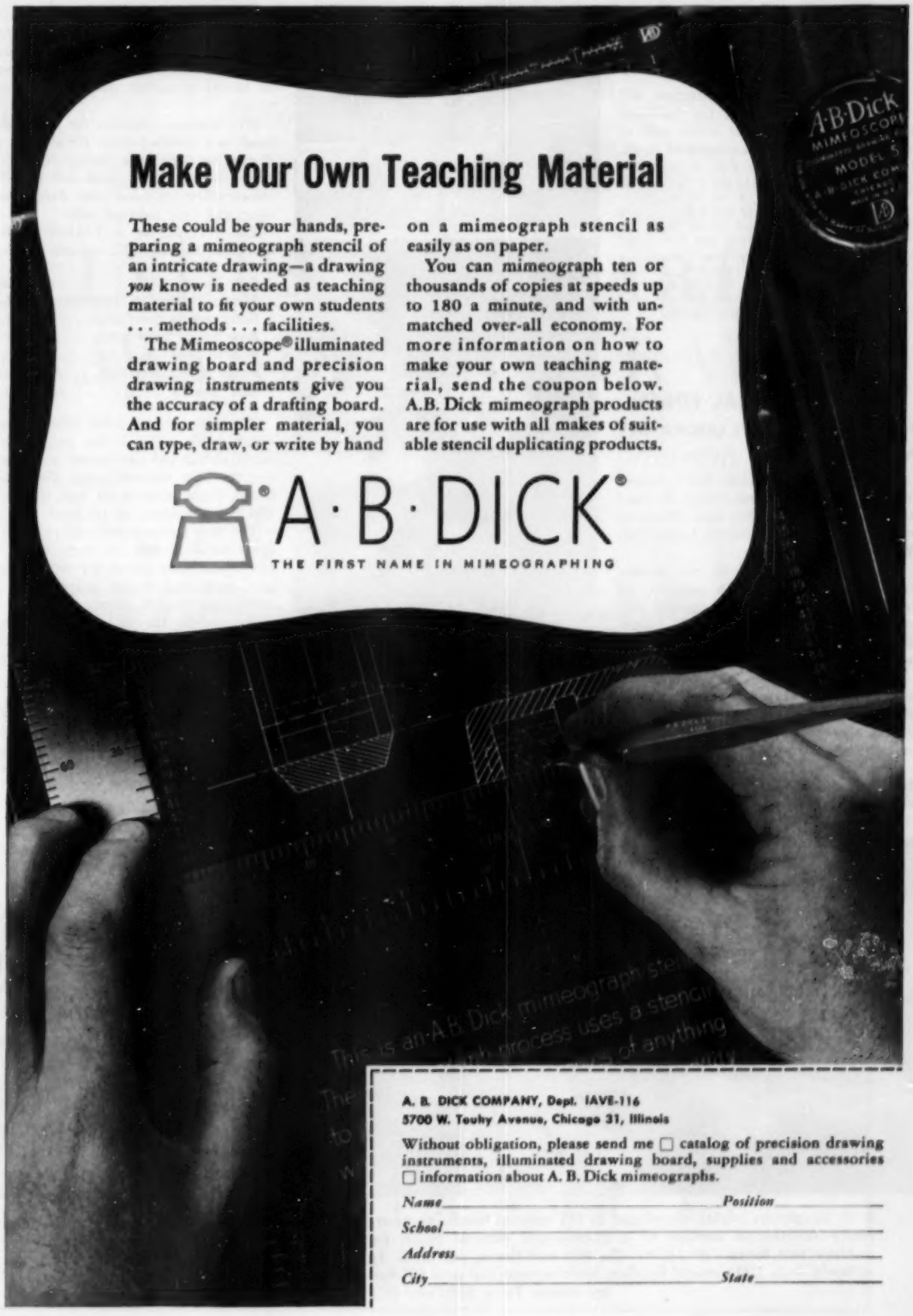

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HIGH AND LOW HURDLES

(Continued from page 312)

Although the cost of construction will vary in different localities, the following bill of materials gives our actual cost of construction per hurdle, exclusive of finish.

2 bases (rough cut), 2 by 4 by 19 in., equals 2.1 B.F., @ $0.13 per B.F. . .	$ .27
2 main uprights 1¼ by 4 by 32 in., equals 2. B.F., @ $0.13 per B.F. . .	.26
2 main crosspieces, 1 by 4 by 46 in., equals 2.5 B.F., @ $0.13 per B.F.	.32
2 hurdle bars (rough), 1 by 4 by 44 in., equals 2.3 B.F., @ $0.13 per B.F. . .	.33
2 swinging vert. bars, 1 by 4 by 23 in., equals 1.3 B.F., @ $0.13 per B.F. . .	.17
2 carriage bolts with 3 washers per bolt and nuts	.14
Total	$1.49

A NEW NATURAL FINISH

THE FOREST PRODUCTS LABORATORY
Madison, Wis.

A practical natural finish that promises to retain the rich natural beauty of wood house siding and trim has been developed at the U. S. Forest Products Laboratory, Madison, Wis.

An increasing number of new houses, especially those sided with western red cedar or redwood, are being finished with natural finishes, according to D. F. Laughnan, chemist in charge of the Laboratory's painting and finishing research.

Natural finishes have been studied for more than 10 years at the laboratory. Many of these finishes available to house owners are so short-lived that they must be renewed each year or two.

The Laboratory has developed a more durable and reliable natural finish, which was formulated to overcome the more serious shortcomings inherent in most natural finishes now available.

Ingredients needed to make 5 gallons of cedar-color FPL natural finish. (Lower) Pouring melted paraffin wax into mineral spirits

Test results so far indicate that the Forest Products Laboratory natural finish should last four years or more before needing renewal. The finish is being tested on houses in various parts of the United States.

Mr. Laughnan classifies the FPL natural finish as a modified stain. He explains that it can be made in a variety of red and brown colors. Three colors well suited for use on siding are cedar color, dark redwood color, and light redwood color.

The formula for a 5-gallon batch of the cedar-colored FPL natural finish is:

Raw linseed oil	3 gals.
Mineral spirits or turpentine	1 gal.
Burnt sienna color-in-oil	1 pt.
Raw umber color-in-oil	1 pt.
Paraffin wax	1 lb.
Penta concentrate 10:1	½ gal.
Zinc stearate	2 oz.

The light redwood finish differs from the cedar finish only in the proportion of burnt sienna and raw umber colors-in-oil. For the light redwood color, 1½ pints of burnt sienna color-in-oil and ⅝ pint of raw umber color-in-oil are used.

The dark redwood finish differs from the cedar finish in that the burnt sienna and raw umber colors-in-oil are reduced to ½ pint each, and 1 pint of pure red iron oxide color-in-oil is added.

By varying the amounts of the burnt sienna and raw umber colors-in-oil, other shades can be obtained to suit individual preferences.

The raw linseed oil, mineral spirits, and colors-in-oil can be purchased at a paint store, the penta concentrate at a paint store or lumber yard, the paraffin wax at the grocery store, and the zinc stearate at the drugstore.

(Continued on page 24A)

D. F. Laughnan (right), developer of FPL natural finish, compares its smooth condition on wood panel with badly weathered sample of a commercial natural finish exposed for same period on the Laboratory's outdoor test fence. At right — On this test fence, the U. S. Forest Products Laboratory is exposing panels of more than 100 natural finishes, both commercial and FPL-formulated. Condition of the finishes is inspected by Joseph Terry (left) and D. F. Laughnan

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Win national acclaim—cash prizes! I.A.A. is the only program giving national recognition to talented industrial arts and vocational students and their teachers. In addition, it offers students a chance to compete for cash prizes. Special prizes will go to the 18 entries showing greatest creative design and ingenuity. Trophies will be awarded schools who have a first-place winner. And – for the 32 Outstanding Achievement Award winners *and their teachers,* event-packed 3-day all-expense trips to Detroit.

Hometown recognition, too. I.A.A. has come a long way in establishing local exhibits for local projects. A good chance to show the people in your town the work you and your students are doing! These exhibits, known as Student Craftsmen's Fairs, were held successfully in 41 principal cities last year. Initial judging takes place at these fairs; final judging in Dearborn. *Why not hold a fair in your area this year?* To help you do it, we've prepared a special pamphlet full of useful ideas—yours for writing us at the address below.

Practically any industrial arts project made by students in the 7th through 12th grades can be entered. Complete information is contained in the 1957 Rules Booklet, which with entry blanks, should reach you by mail by Dec. 1. If you fail to receive yours, you may obtain one by writing Ford Industrial Arts Awards, 3000 Schaefer Road, Dearborn, Michigan.

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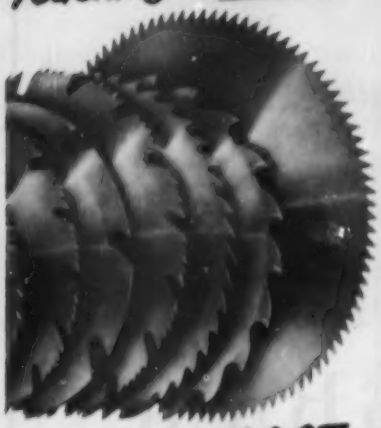

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A NEW NATURAL FINISH

(Continued from page 22A)

House owners can prepare the FPL finish, but it may be better to have a professional painter do it, since he is more experienced with such materials.

To prepare the FPL finish, pour the gallon of mineral spirits into a 5-gallon pail or open-top-can. Put the paraffin and zinc stearate in a pan and heat over a flame. Stir until a uniform mixture results. Pour the mixture into the mineral spirits, stirring vigorously while it is being added.

CAUTION: There should be no open flame in the room at the time the paraffin mixture is being added to the mineral spirits, because the hot mixture raises the temperature of the mineral spirits to a point where it might catch fire.

When the mineral spirits solution has cooled to room temperature, add the ½ gallon of pentachlorophenol concentrate, and follow with the linseed oil. Then stir in the colors-in-oil, a little at a time, until the mixture is uniform. It is then ready for use.

A single application of the FPL natural finish is recommended on smooth, new wood such as the planed face of bevel siding. On such a surface a gallon will cover 400 to 500 square feet. More than one application may cause nonuniform appearance, with glossy and dull spots.

On a rough surface, such as the unplaned face of bevel siding, two applications of the finish are recommended, and a gallon should cover 200 to 250 square feet.

Laughnan cautions against applying the FPL natural finish over finishes that leave surface coatings as varnishes and many natural finishes do. These coating-type finishes prevent it from penetrating into the wood, hence must be removed if it is to adhere to the wood and give normal service, he explains.

All finishes have limitations, including this one. Our finish is rather slow in drying; a few days of good drying weather are generally required for it to dry thoroughly. The presence of wax in the finish will make it risky to paint over. It is recommended to give a surface treated with this finish, a thorough scrubbing with a good wax solvent before putting paint over it.

Listed as advantages of this finish are its good color retention, its soft sheen, and its property of shedding water. Tests indicate it should last approximately 4 years and should simply wear or erode away, thus presenting a very easy surface to refinish.

Metallurgical coke and high-test gasoline are to be manufactured from Utah's native gilsonite deposits. Gilsonite, a unique hydrocarbon mineral, is noted for its lack of impurities. — *Industrial Research Newsletter.*

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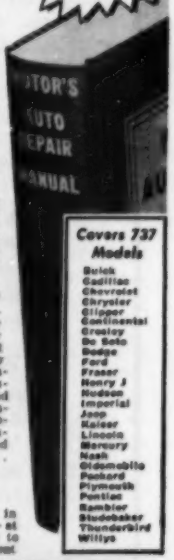

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PERSONAL NEWS

(Continued from page 6A)

of the College's teacher education programs, both undergraduate and graduate. It also prepares recommendations for certification of graduates.

The Council consists of seven members of the general faculty, the heads of the four teacher-education departments, and three members of the general faculty from other departments of the College, appointed annually by the President on recommendations of the Executive Committee.

The Co-ordinator is responsible to the President through the Dean of the College for the policies and practices of teacher education in harmony with those of the Texas Education Agency. The Co-ordinator is the official representative of the College for routine meetings with the Texas Education Agency relative to teacher education.

NEW STAFF MEMBERS NAMED

RALPH O. GALLINGTON, formerly Professor of Industrial Arts at the Pennsylvania State University, effective in the fall of 1956, will become chairman of the Industrial Education Department and acting head of Applied Science at Southern Illinois University, Carbondale, Ill.

MARK KLOPP, former instructor of engineering drawing at the Pennsylvania State University, has recently joined the Applied Science Staff at Southern Illinois University. He will be assigned to teach engineering drawing and industrial education at Southern.

Mr. Klopp is a member of the American Society for Engineering Education, Iota Lambda Sigma, and the Toatsmasters International.

He has had considerable experience as an auto mechanic as well as drafting experience.

C. M. MOELLER has recently accepted an appointment as Associate Professor of Applied Science at Southern Illinois University. Mr. Moeller, who is near the completion of his Ph.D. at Cornell University, has been teaching engineering subjects at Cornell since September, 1951. His college teaching experience has also included work at Kansas State College, where he earned the M.S. degree in 1951, and Montana State College. He completed the B.S. degree in Civil Engineering in 1936 at the University of Nebraska.

Mr. Moeller has had considerable experience in surveying, photogrammetry, transportation engineering, and administration. During World War II, he was advanced to Captain's rank and now holds the Major's rank in Organized Reserve. He is a member of several engineering societies and associations.

DR. JAMES JENKINS, JR., former Associate Professor of Industrial Arts, East Carolina College, Greenville, N. C., has accepted an appointment to the Industrial Education Staff at Southern Illinois University. Dr. Jenkins has also held a teaching assignment at the Pennsylvania State University. Prior to his college teaching he was, for over ten years, a high school teacher in the public schools of Pennsylvania. During World War II, Jenkins was an Air Force pilot.

He is a member of the N.E.A., American Vocational Association, Phi Delta Kappa, Iota Lambda Sigma, and the Lions Club.

Dr. Jenkins will be assigned to the supervision of industrial-arts student teachers and University School teaching primarily. He will also assist in the more professional course work and in the graduate program at Southern.

TEACHERS APPOINTED TO STOUT

Appointment of 11 teachers to the faculty of Stout State College, Menomonie, Wis., has

(Continued on next page)

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PERSONAL NEWS

(Continued from previous page)

been announced by Dr. Verne C. Fryklund, president. Of that total, four are teachers filling positions necessitated by Stout's record enrollment. The remainder replace instructors of the previous year. Two more teachers are yet to be appointed.

Head of the department of music is Dr. Edfield A. Odegard. He earned his doctorate at the University of Iowa, with earlier degrees from Concordia college and the University of Washington. His appointment at Stout is that of assistant professor.

In addition to wide experience in secondary school music, Dr. Odegard headed the music program of Wartburg college. He has also worked with the bands of five Big Ten Universities. For three years he was a member of the U. S. Navy Band.

Dr. Lorna S. Lengfeld has been named to Stout's Department of Speech. She has earned her three degrees, including the doctorate, in the speech department of the University of Wisconsin. Following teaching experience at the universities of Wisconsin and Minnesota and at Wilson college, Mrs. Lengfeld was a faculty member at North Dakota State college before coming to Stout.

At Stout State College Dr. Lengfeld will hold the rank of assistant professor in the speech department and will be in charge of the dramatics productions of the college.

Assistant librarian in charge of general and reserve circulation is Dr. Lillian S. Cooper, who comes to Stout as an instructor following her work in the reference department of the Armed Forces Medical Library in Washington, D. C. Mrs. Cooper holds three degrees from the University of Wisconsin.

Dr. Cooper has had extensive experience in teaching as well as in library, the latter including four years on the staff of the medical library of the University of Wisconsin.

Assistant professor of home economics with emphasis on equipment, demonstration, and consumer information is Miss Dorothy Clure. She earned her bachelor's degree at Iowa State College and her master of arts at the University of Chicago.

Miss Clure, in addition to experience in the teaching of home economics, has held a number of positions as a home economist in the commercial field. Corporations for which she has been a lecturer, test kitchen specialist, or home-economics director include Commonwealth Edison, Evaporated Milk Association, Electromaster, Inc., Gibson, Norge and the Admiral Corporation.

New head coach of football, basketball, and baseball at Stout is Joseph S. Gerlach, holder of two degrees from the University of Wisconsin. His rank is that of assistant professor of physical education.

Gerlach comes to Stout from the Duluth Branch of the University of Minnesota, where he coached in a number of sports. He has also compiled successful records at the University of Alaska and North Dakota State College at Dickinson, N. Dak.

Instructor in foods and nutrition is to be Miss Dorothy Knutson, a Stout graduate who later earned a master of science at Ohio State University. Prior to joining the Stout faculty she was assistant therapeutic and teaching dietitian in St. Luke's Hospital, Cedar Rapids, Iowa.

Following her dietetic internship at University Hospital, Columbus, Ohio, Miss Knutson was also teaching and therapeutic dietitian at St. Elizabeth's Hospital, Chicago.

O. Clifford Kubly, principal of Kiel high school, has joined the Stout faculty as assistant professor of mathematics and physics. He has his master's degree from the University of Wisconsin and a bachelor's degree from Platteville State College.

Kubly has also studied at Case Institute in Cleveland, Ohio, the result of being selected for a General Electric fellowship. In addition to teaching and administrative work in several Wisconsin high schools, he also worked for a time in the U. S. Department of Agriculture.

Instructor in home economics is Mrs. Winifred Loomis, who was a member of the Stout Faculty from 1949 to 1952 prior to her marriage. She will devote much of her time to Stout's expanded offerings in clothing selection.

Mrs. Loomis completed her master's degree at the University of Wisconsin, after earning her bachelor's degree from Milwaukee Downer college. Her teaching experience, in addition to her earlier position at Stout, includes appointments in Sheboygan Falls, Sheboygan, Marinette, and Wausau.

Named assistant professor of industrial education has been Wesley S. Sommers. Prior to his arrival at Stout he completed a year's study of industrial design under the auspices of the Ford Foundation.

Sommers earned a bachelor's degree in engineering at the University of Michigan. He also has his master of science from that institution. At Stout he will teach specialized courses to men majoring in industrial technology.

Accepting a temporary appointment as instructor of printing is Paul Axelsen. He fills the position of Raymond Cornwell, now working toward his doctorate on a Danforth scholarship.

(Continued on page 28A)

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PERSONAL NEWS

(Continued from page 26A)

Axelsen has earned two degrees from Stout State College. In addition, he has had extensive graphic arts experience, both in teaching and in commercial enterprises.

Part-time assistant in home economics is Miss Hazel Nelson, a Stout graduate who enjoyed a very successful teaching career at the high school in West Salem, Wis.

Miss Nelson will divide her time teaching in Stout's division of home economics and working toward a master's degree in the graduate studies program of the college.

NEW STAFF MEMBER ADDED

LeVerne V. Patterson has been added to the staff of the industrial education department, A. & M. College of Texas, College Station, Tex., as an assistant professor beginning with the present school year.

Mr. Patterson has the bachelor of science degree from the University of Illinois, the master of science degree from the University of Illinois, and has completed all course work leading to the doctorate degree at Bradley University, Peoria, Ill.

His specific assignment with the industrial education department will be to teach courses in industrial safety and supervision to industrial technology students.

His experiences include several years teaching industrial subjects in the high schools of Illinois and West Virginia. While pursuing the doctorate program at Bradley University, he taught part time on their college staff. His most recent assignment before coming to A. & M. College was Co-ordinator of Diversified Cooperative Training for the public schools of Vero Beach, Fla. He has also had several years' experience in industry with the Waco Aircraft Company in the area of safety and supervision.

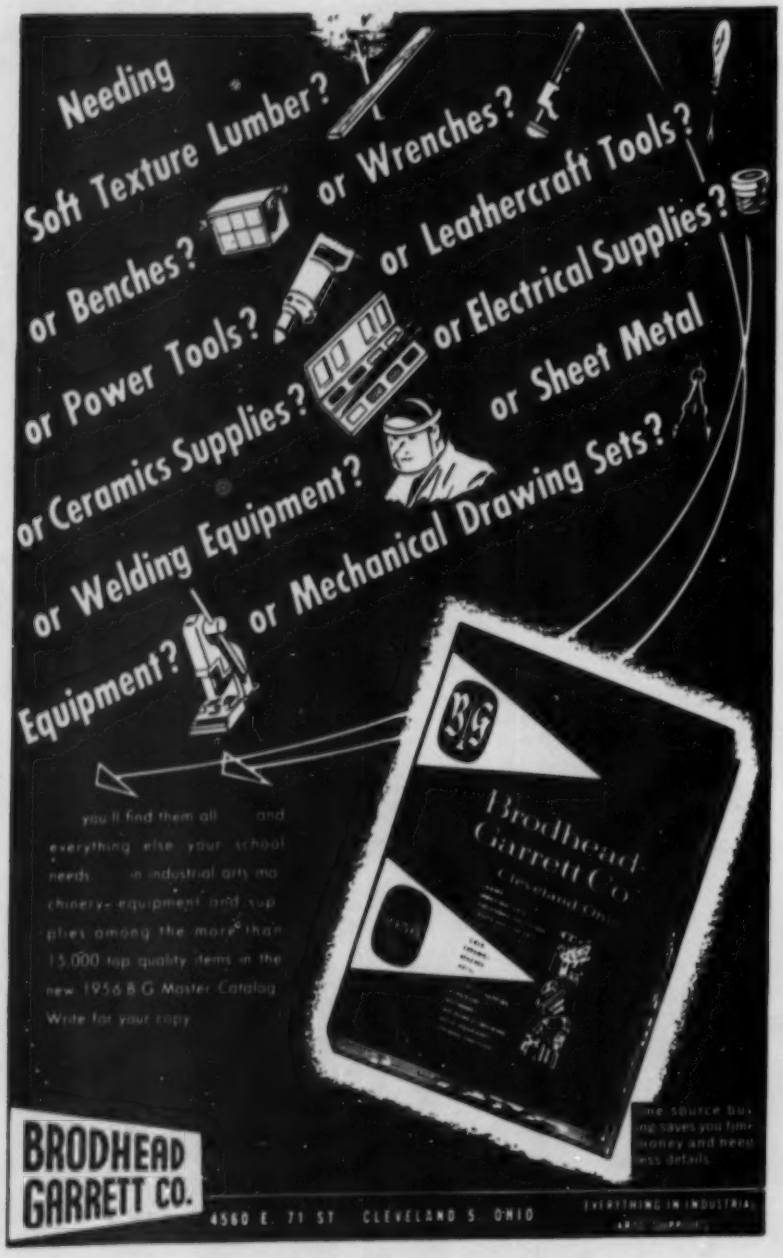
MR. WORTHINGTON RECEIVES APPOINTMENT

Robert M. Worthington was appointed assistant state supervisor of Trade and Industrial Education by the Minnesota State Board for Vocational Education, and assumed his new duties on July 15, 1956. He succeeds Charles A. Shubat, who is now state supervisor of Private Trade Schools.

Mr. Worthington comes to the State Department staff from the University of Minnesota where he has been teaching undergraduate industrial arts and doing advanced graduate work since 1953. He is well qualified for his new job. A graduate of Eastern Kentucky State College, he earned a B.S. degree in 1946 with a major in Industrial Arts. In 1949, he earned the M.A. degree in Industrial Education at the University of Minnesota and is currently writing his doctoral dissertation after completing all course requirements. His topic for his Ph.D. thesis is entitled "Factors Which Affect the Delayed Imitation of a Demonstrated Psycho-Motor Skill," an experimental study to investigate the extent to which verbalizing and other factors affect the delayed imitation of a demonstrated skill.

Mr. Worthington is currently serving as president of the Minnesota Industrial Arts Association. He is also president-elect and convention chairman of the Minnesota Vocational Association. He is very active in youth work in Minnesota and has received national recognition for his work as chairman of the St. Paul Elks Youth Activities Program.

Mr. Worthington taught industrial arts at both the junior and senior high school level in St. Paul. He also served as instructor of manufacturing processes at Purdue University. In addition to his teaching experience and educational background, he belongs to many professional organizations, has participated in community and service organization work, and has contributed to a number of publications.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♦ Dr. Nelson A. Hauer has returned to his former position as professor and head of the Department of Industrial Education, Louisiana State University, after a two-year leave of absence in Lebanon where he was in charge of a team of six technicians to develop a program of Trade and Industrial Education, as part of the work of the International Cooperation Administration Program.

♦ Ralph B. von Guerard, associate professor of education at New York University, has been named assistant dean of admissions, as announced by Dr. Elwood C. Kastner, dean of admissions and registrar at New York University.

Professor von Guerard will be primarily concerned with admission affairs relating to the University's School of Education. He joined the NYU faculty in 1950 and has served as associate director of the School's Center for Community and Field Services, and as director of institutional research and service for the school.

A native of Rockton, Ill., Professor von Guerard was graduated from high school in Beloit, Wis., and is an alumus of the University of Wisconsin.

♦ Leland W. White joined the staff of the Industrial Arts Division, Northern State Teachers College, Aberdeen, S. Dak., beginning with the fall quarter, September, 1956.

He earned the B.S. in Industrial Education at State Normal and Industrial College, Ellendale, N. Dak.; and the M.S. in Industrial Arts at Colorado A. & M. College, Fort Collins, Colo.

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News Notes

PRESIDENT'S COMMITTEE ON EDUCATION

Devereux C. Josephs, chairman of the President's Committee on Education Beyond the High School, has recently invited five leading educators to conduct "workshops" in five regions of the country to prepare for regional conferences to be held next spring.

The "workshops" are intended to lay the groundwork for the regional conferences and to recommend ways in which the President's Committee can stimulate discussion and action in the various regions on the problems of post-high school education.

In his letter of invitation to the educators, Mr. Josephs pointed out that the extent and nature of the problems of education beyond the high school differ widely from region to region and from state to state, and that therefore the "workshops" can ensure that the regional conferences focus discussion on the needs of each region.

Those invited to plan and conduct the regional "workshops" are Robert C. Anderson, acting director, Southern Regional Education Board, Atlanta, Ga.; Dr. B. L. Dodds, dean, College of Education, University of Illinois, Urbana, Ill.; Dr. Harold L. Enarson, director, Western Interstate Commission for Higher Education, Boulder, Colo.; Mrs. Charles Kerby-Miller, dean, Radcliffe College, Cambridge, Mass.; and Dr. Carroll V. Newsom, executive vice-chancellor, New York University, New York City.

In appointing the Committee last April, the President requested the Committee to develop proposals, "through studies and conferences," for bettering opportunities for post-high school education. The regional conferences are a result of this charge.

In addition to the regional conferences, the Committee will conduct studies of its own, the results of which are to be included in a report to the President by the end of 1957.

ELVIN J. STAHR, JR., of Lexington, Ky., was appointed to serve as Staff Director of the President's Committee on Education Beyond the High School. He will take leave of absence from his duties as Provost of the University of Kentucky and Dean of the University's College of Law.

"HONORS" PROGRAM PROVIDED

Gifted students attending Kansas State College, Manhattan, Kans., will have the opportunity, beginning this fall, of participating in an "honors" program which provides for special courses and special counseling for particularly able students.

John C. Weaver, dean of the Kansas State School of Arts and Sciences, said the honors program would be available to those in the upper 5 per cent of their college class.

Entering freshmen who show by high school grades and entrance tests that they are eligible may elect to enter the program. They will be assigned to special advisers in their major field and a special four-year course of study will be worked out for each individual.

Students already in college may petition to change their program to "honors" if their records show they are at the top of their class.

One of the advantages of the "honors" program is that it permits a student to bypass elementary courses in which he already has competence. While the program does not propose to shorten the four years of study necessary to obtain a degree, it does allow the gifted student to reach goals beyond the ordinary limits of undergraduate education.

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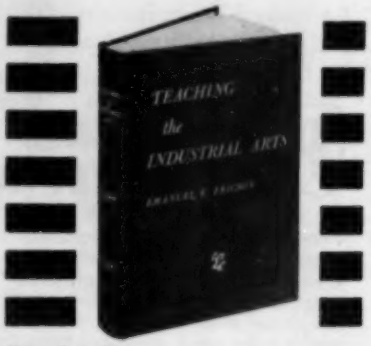

Revised! This revised edition has been rewritten extensively in recognition of changes and developments which have taken place since the original volume was presented. Informative revisions have been made on such important material as methods and procedures in teaching, class organization and shop management, safety instructions and accident prevention, testing and recording pupil progress and making courses of study. The first ten chapters deal with the teaching activities of the complete school year; while the remaining chapters deal with many of the added responsibilities of the teacher outside the classroom. Tells how to simplify, improve and really enjoy your work.

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APPROVE CREDIT ARRANGEMENTS

Wayne State University's College of Education and Graduate School again approve credit arrangements in connection with the Tenth Annual *European Study Tour in Comparative Education*. Personally conducted by Dr. Wm. Reitz, professor of education, the tour will leave Detroit on June 21, 1957, and return on August 24, 1957.

Visiting 10 countries in 9 weeks, this tour is designed to provide teachers, students, and professional people with an opportunity to survey selected highlights of the life and culture of Western Europe.

Qualified persons may earn up to 8 hours of undergraduate or graduate credit to apply on degree programs, for teaching certification, for annual salary increments, or for personal enrichment.

Further information may be obtained from *Dr. Wm. Reitz, 727 Student Center, Wayne State University, Detroit 2, Mich.*

FELLOWSHIP OFFERED

The Towle Silversmiths, manufacturers of sterling holloware and flatware in Newburyport, Mass., are offering a fellowship to a student of three-dimensional design who will complete his or her schooling in the spring of 1957. The fellowship will run from September, 1957, through August, 1958, and consists of:

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2. Trips for design research (all expenses paid):
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   - *c*) One week in New York City;
   - *d*) Attendance at the International Design Conference, Aspen, Colo.

Candidates for this fellowship are invited to write to *William DeHart, Director of Design, Towle Silversmiths, Newburyport, Mass.*

NEW LABORATORY ESTABLISHED

The nation's first laboratory for instruction in shaped diamond tool technology has been established at Illinois Institute of Technology, Chicago.

The laboratory has been assembled by the IIT mechanical engineering department under a $30,000 grant from Industrial Distributors, Ltd., Johannesburg, South Africa.

A course designed to instruct industry in the construction and use of shaped diamond tools will be offered for the first time this fall. The course will cover selection of diamonds for various uses, sawing and shaping diamonds for tools, and turning, boring, and wheel dressing. The course will be offered evenings, and will be scheduled again for the spring semester and as a special summer course.

For further information on the course, write to: *Dr. Frank D. Carvin, Illinois Institute of Technology, Technology Center, Chicago 16, Ill.*

♦ Drafting educators from high schools and vocational schools in the greater Milwaukee area were given an opportunity to learn at firsthand the requirements of industry when Allis-Chalmers Manufacturing Company played host recently to 130 teachers, supervisors, counselors, and administrative school personnel.

The group was welcomed by J. W.

(Continued on next page)

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NEWS NOTES

(Continued from previous page)

McMullen, vice-president and general manager, Power Equipment Division.

Speakers and their subjects were J. F. Roberts, vice-president and director of engineering, Industries Group — "Industry's Growing Needs for Drafting Personnel"; F. W. Churchill, supervisor, drafting training — "The Drafting Teacher's Part in Preparing Young Men for the Field"; and R. J. Pekarski, chief draftsman, motor and generator department — "New Trends in Drafting Practices."

♦ The Photographic Society of America, 2005 Walnut St., Philadelphia 3, Pa., sponsors a PSA-Foreign Student Contest in order to create a 100-print show of photographs by students from other countries now enrolled in any recognized university or college in the U. S. A.

For information and contest rules, address PSA-Foreign Student Contest, Box 1872, Grand Central Sta., New York 17, N. Y.

The closing date is November 11, 1956.

The theme of the contest is "My Impression of the U. S. A." There is no entry fee.

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New Publications

Masonry Simplified — Volume I, Tools, Materials, Practice

By Ralph Dalzell and Gilbert Townsend. Cloth, 463 pp., 5¾ by 8½ in., illus. American Technical Society, Chicago, Ill.

This is the third edition of this book. It contains a comprehensive presentation of modern masonry construction, and explains and illustrates the construction processes so that the reader can plainly visualize how the work is to be done.

There is also a chapter on blueprint reading.

The eight chapters cover the material in the following way. Chapter I explains how lime is manufactured and applied. Then mortar types, their properties, and uses are explained. Concrete characteristics, and mixing and concrete masonry are discussed; as are also clay tile, brick, masonry sidewalks, driveways, floors, and steps.

The book also contains a dictionary of building terms.

Modern Furniture You Can Build

Cloth, 200 pp., 6⅛ by 9½ in., illus., $2.95. Popular Mechanics Press, Chicago, Ill.

This book will please the do-it-yourself addict. It presents him with 200 pages of splendid designs of modern furniture.

It also has a chapter on how old furniture can be modernized, and also explains how to upholster with foam rubber, and how to do plastic veneering and how to use plastic webbing.

Inverse Feedback

Edited by Alexander Schure. Paper cover, 56 pp., 5½ by 8½ in., illus., 90 cents. John F. Rider Publisher, Inc., New York, N. Y.

This is the 15th book in the electronic technology series published by this firm. It explains the principles and applications of inverse feedback as applied to electronic devices.

It is written for the student, laboratory technician, and engineers who are working in the field of electronics.

Basic Electronics — Laboratory Manual for Radio and Television Technicians

By Paul B. Zbar and Sid Schildkraut. Paper, 91 pp., 8½ by 11 in., illus. McGraw-Hill Book Co., Inc., New York, N. Y.

This manual presents 23 instructional units developed by the Radio-Electronics-Television Manufacturers Association for the training of technicians sorely needed in the fields of radio and TV.

Basic Electrical Principles

By Maurice G. Suffern. Cloth, 454 pp., 5¾ by 8¼ in., illus., $4. McGraw-Hill Book Co., Inc., New York, N. Y.

This is the second edition of this text which is designed to give vocational students a firm understanding of electricity. He has aimed to express the material that they must study as simply as possible without entering

(Continued on page 34A)

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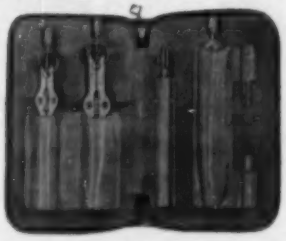

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NEW PUBLICATIONS

(Continued from page 32A)

into the higher technical-education phases or the extensive fields of mathematics or physics.

In the 12 chapters contained in the book he treats of batteries, electrical circuits, electromagnetism, alternating current, inductance, capacitance, effects of inductance and capacitance, the electric generator and motor, rectification of alternating current, and the electric meter.

The appendix contains an explanation of square root, quiz answers, a summary of formulas, resistor color coding and identification, capacitor color coding and identification, and a list of visual aids.

Drawing and Planning for Industrial Arts

By John L. Feirer. Cloth, 376 pp., 7 by 10 in., illus. Chas. A. Bennett Co., Inc., Peoria, Ill.

This text aims at giving industrial-arts students practice in making a picture of what they want to make in the shop.

The book is exceedingly well illustrated and contains hundreds of sketches and pictures from which ideas may be gleaned for designing one's own projects.

Section 1 of the book gives directions on how to begin making a drawing.

Section 2 is devoted to sketching, designing, and planning.

Section 3 gives the student an idea of what drafting practice embraces.

Section 4 is devoted to shop drawing; and sections 5 and 6 present life activity drawings, and drawing information.

Architectural Graphic Standards

By Charles George Ramsey, A.I.A., and Harold Reeve Sleeper, F.A.I.A. Cloth, 758 pp., 9½ by 11¾ in., illus., $18.50. John Wiley & Sons, Inc., New York, N. Y.

This is the fifth edition of this valuable book for architects and builders. The material has been thoroughly revised.

The authors state that 75 per cent of all the pages are either new or revised.

Eight major subjects have been added. These include: design of plank and beam framing, curtain walls, pneumatic tubes, elevators and escalators, special fireplaces, comparative costs of roof covering, furniture and equipment, and ceramic tile and its correct usage.

Of the old plates, 236 have been revised, and 286 new plates have been added.

Servicing and Calibrating Test Equipment

By Milton S. Kiver. Cloth, 192 pp., 5½ by 8½ in., $2.75. Howard W. Sams & Co. Inc., Indianapolis, Ind.

This book shows the service technician how to keep his test instruments in reliable working order. It tells how to determine their proper operation, how to avoid erroneous indications; explains typical calibration procedures; gives a method for performance record keeping. Also covered is the most frequently used equipment.

The chapters cover pitfalls to avoid when using test equipment; simple ways to check instrument accuracy; keeping instrument operational records; preventive maintenance measures; and how to service your test equipment.

Electronic Tubes, Circuits, and Devices

By Lewis G. Blevins. Paper, 620 pp., 8¼ by 11¼ in., illus., $4.50. Universal Scientific Co., Inc., Vincennes, Ind.

This textbook, which is the third one in a series, covers the fundamental principles

(Continued on page 36A)

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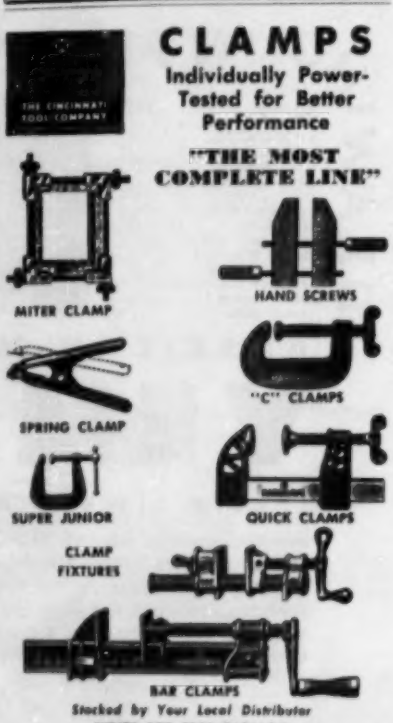

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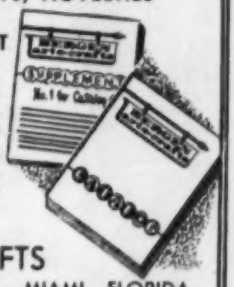

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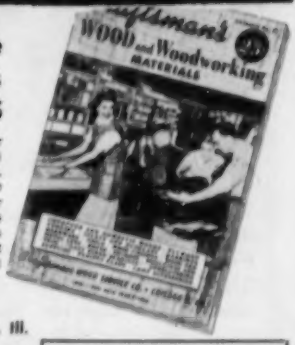

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NEW PUBLICATIONS

(Continued from page 34A)

and their application of electronics. The book contains some 60 exercises on radio transmitting and receiving, radar and TV, and electronic controls.

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The book is copiously supplied with half tones, schematics and graphs, and the material is so presented that students with limited technical and mathematical backgrounds will be able to follow the discussion.

The electronic tube principles are presented by 21 experiments, fundamental electronic circuits by 4 experiments, vacuum tube generators by 8 experiments, radio frequency voltages and currents by 3 experiments, inductance and capacitance at radio frequencies by 5 experiments, radio communication and control circuits by 6 experiments, industrial electronic controls by 7 experiments, basic radar, television, and electronic computing circuits by 2 experiments, very high frequency principles and circuitry by 2 experiments, and electronic instruments by 2 experiments.

Strength of Materials

By Gerner A. Olsen. Cloth, 444 pp., 6⅛ by 9¼ in., illus., $5.25. Prentice-Hall, Inc., New York, N. Y.

This is the second edition of this book in which the author has striven to simplify some parts, elaborate others, clarify some very difficult theoretical derivations, and in general make this subject of strength of materials more understandable to the student.

The contents of the book present principles of mechanics that apply to strength of materials; center of gravity and moment of inertia; fundamental stress and strain relationships; stresses in thin walled cylinders and spheres, and riveted and welded joints; torsion; shear and bending moment diagrams; beam design; deflection of simple beams; statically indeterminate beams; eccentrically applied loads; columns; combined stresses; fatigue strength and stress concentrations; and a number of useful tables.

Practical Marine Engineering

By Reno C. King, Jr. Cloth, 541 pp., 5¾ by 8¼ in., illus., $5.50. Prentice-Hall, Inc., New York, N. Y.

This is the second edition of this book which in its previous edition has already found many friends among the practical marine engineering fraternity and applicants for merchant marine engineering-officer licenses.

The book thoroughly discusses the marine power plant; boiler construction (Scotch boilers, and water-tube boilers); combustion; boiler operation and maintenance; boiler-water problems; reciprocating steam engines; steam turbines; electricity; refrigeration; pumps and unfired pressure vessels; miscellaneous equipment; respiratory apparatus; fire-fighting equipment, rules and regulations; and engine-room mathematics.

Machinists' Ready Reference

Compiled by C. Weingartner. Spiral binding, 126 pp., 4⅜ by 6 in., illus., $1.50. Prakken Publications, Ann Arbor, Mich.

A pocket-size handbook containing selected reference tables and charts commonly used in the machine shop.

These charts and tables cover mathematical information; drills; tapers; screw threads; milling, shaping, turning; gears; weights, gauges, tolerances; and general information.

Basics of Phototubes and Photocells

By David Mark. Paper, 128 pp., 5½ by 8½ in., illus., $2.90. John F. Rider Publisher, New York, N. Y.

This book explains the principles of phototubes and photocells which are now used so extensively in electronic devices.

All About Small Gas Engines

By Jud Purvis. Cloth, 304 pp., 6⅛ by 8¾ in., illus., $4.50. The Goodheart-Willcox Co., Inc., Chicago, Ill.

A well-written and well-illustrated book for all who want to learn about two- and four-cycle gas engines. It explains thoroughly these engine operations; how cylinders, crank and camshafts, bearings, pistons, and valves function; the need for cooling systems and lubrication; how trouble shooting, tune-up, and reconditioning is taken care of; and how carburetors, starting, lighting, and ignition systems can be kept in good working order.

The book also contains a fine glossary of terms.

Cookery Encyclopedia

By Philip Harben. Cloth, 480 pages. Price, $10. Philosophical Library, New York, N. Y.

This book, the outgrowth of some years of demonstrations of cookery by television, is arranged in handy encyclopedic form, and is illustrated with 350 photographs in black and white. The recipes include not only the ingredients but full directions for preparation. While the author has strong preferences for French dishes, the recipes are quite American in every respect and fully meet our ideas of balanced dishes, of a broad and generous dietary, and tasty as well as satisfying meals.

Television Engineering — Principles and Practice

By S. W. Amos and D. C. Birkinshaw. Cloth, 270 pp., 5¾ by 8¼ in., illus., $15.

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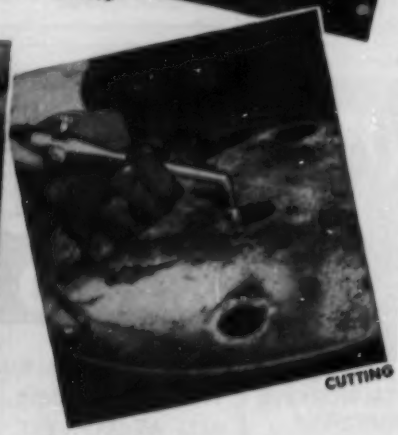

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Philosophical Library, New York, N. Y.

This text describes the fundamental principles of video-frequency amplifiers and examines the factors which limit their performance at the extremes of the passband. A number of circuits are described and the use of feedback also is explained.

The book is divided in five parts. The first of these describes the fundamentals of video-frequency amplifications. The second deals with video-frequency amplification — high-frequency consideration. The third discusses the low-frequency considerations.

Part four takes up feedback in video-frequency amplifiers, and part five discusses noise in video-frequency amplifiers.

Education in Mexico

By Marjorie C. Johnston. Office of Education Bulletin 1956, No. 1. 135 pp., 55 cents. For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

Education in Mexico (*La Educacion en Mexico*) is the latest in a series of basic studies on education in the American Republics. This attractive bulletin has been written for students contemplating study in Mexico, students of the Latin-America area, persons concerned with inter-American education, including exchange teacher programs, admissions officers who receive applications from Mexican students, and visitors to Mexico.

The study is comprehensive in scope, offering considerable background material on the people, economic conditions, political and educational history of Mexico, as well as the essential facts on education today. The booklet has basic information on preschool, primary, secondary, vocational, teacher, and higher education. Charts, tables, and a map clearly present data on enrollment, numbers of schools, and courses offered. The section on higher education lists all colleges and universities and has thirty-three pages of actual plans of study and course requirements.

Materials found in addition to the basic educational data are statistics on literacy, listings of vocational education schools, requirements for academic specialists, and both a Spanish and English bibliography.

Although the bulletin is written particularly for those directly concerned with Mexican education, it provides interesting material on this aspect of Mexican life for the traveler as well as the teacher or student.

How to Plan and Build Your Workshop

By David K. Manners. Cloth, 141 pp., 6 15/16 by 9 7/8 in., illus., $2. Arco Publishing Co., New York, N. Y.

A book that will delight many home craftsmen. It shows how to plan the shop, make workbenches, power tool stands, sawhorses, portable shops, cabinets and supply storage, and hand tool storage boards.

It also has an excellent chapter on safety in the home shop.

A Short Dictionary of Weaving

By M. E. Pritchard. Cloth, 196 pp., $6. The Philosophical Library, New York, N. Y.

This carefully and accurately written dictionary includes practically all of the terms commonly used in hand weaving and provides also a considerable number of words used by spinners and dyers. The final section of the book includes directions for setting up patterns on the loom and for doing the simplest type of pattern weaving. The viewpoint is entirely that of British weavers.

Arithmetic for Engineers

By Charles B. Clapham. Cloth, 558 pp., 5½ by 8½ in., illus., $6.50. John F. Rider Publisher, Inc., New York, N. Y.

This text is designed for technical students, apprentices, machinists, tool and die maker students, mechanical draftsmen students, and mechanical engineering students. The book contains over 390 detailed explanations of principles with examples; 1950 exercises; teaching aids and helpful hints; and correct solutions and answers to problems. The book serves exceedingly well for school or home study.

Measurements of Mind and Matter

By G. W. Scott Blair. Cloth, 115 pp., 5 5/16 by 8¼ in., illus., $4.50. Philosophical Library, Inc., New York, N. Y.

This book, though written on a highly technical subject, has been so written that the intelligent reader can read and enjoy it while grasping its meaning.

The book treats of the principles of measurement, the physical theory of dimensions, dimensions in relationship to properties, mental measurements and psychological dimensions, the principles of uncertainty and of intermediacy, the theory of quasi-properties and Gestalt psychology, and extension of physics.

How to Make Good Tape Recordings

By C. J. Le Bel. Cloth, 151 pp., 5 5/16 by 8 in., illus., $1.50. Audio Devices, Inc., 444 Madison Ave., New York 22, N. Y.

A new handbook which will be of great interest and help to all who use tape recording machines. It describes how tape recorders work, how to select a tape recorder, how to select the recording tape, how to use the tape recorder, and how to make a microphone recording.

It also describes how to treat the studio for improved acoustics, how to edit the tape, and how to arrange a recording show.

The book also has a glossary of recording terms.

CASTOGLAS PROJECT OF THE MONTH

Making cloisonne jewelry with wood veneer strips and colored Castoglas. Students from seventh grade through college will be intrigued by the challenge of creating their own contemporary designs.

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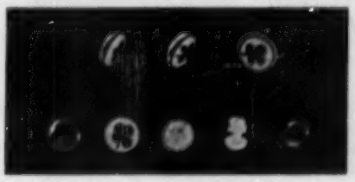
Rare woods ingeniously combined with Castolite and Castoglas inspired these designs.

Bits of rare woods and hand-wrought wire designs have been combined with liquid Castoglas and Castolite to form the professional-looking contemporary jewelry pieces shown in the illustrations.

The art of embedding started with Nature's own amber in which perfectly preserved specimens are found, millions of years old and still retaining their original forms. The art continues today in school shops where students embed cameos, fish, flies, tiny flowers and colorful insects to make these unusual key tags, earrings, pendants and cuff links.

But these students have cut Nature's process down to a matter of minutes, easily achieving the same results! The new process is simplicity itself. Easy to make, these inexpensive take-home projects, costing between 10c to $1.00, compare favorably in quality with costly jewelry items and make most welcome and unusual Christmas gifts.



Embedding fish flies and four leaf clovers continues to be as popular as ever.

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Shop Equipment News

THE DELTA METAL CUTTING LATHE

Four new accessories which will convert the Delta 11-in. metalworking lathe into a turret lathe have been announced by Rockwell Manufacturing Company's Delta Power Tool Division.

All four, including a bed turret, turret tool post, lever-type collet closer, and coolant group, fit both the 4-ft. bed and 5-ft. bed models of the lathe.

Delta Metalworking Lathe converted into a turret lathe

With these accessories, the lathe can be used on the production line for precision manufacturing as well as in toolrooms, maintenance departments, and experimental departments as an engine lathe, the purpose for which the tool was originally designed.

As modified by the accessories, the lathe is recommended as *ideal* for manufacture of duplicate parts and for all primary and secondary machining operations.

For further information write to Delta Power Tool Division, Rockwell Manufacturing Company.

(For Convenience Circle Index Code 0901)

HOME WORKSHOP POWER MACHINE

The Yates-American Machine Company have introduced a Home Workshop Combination Machine, which can be instantly and safely converted from an 8-in. tilting arbor saw to a 10-in. disk sander or a 4-in. jointer by simply turning a wheel. Utilizing the machine's power take-off and quickly and safely attached accessories, it can also be converted into a wire brush, a buffer, a rotary file or router, a drum sander, a powerful portable drill or hole shooter, and a polisher.

Because of its ample table surface the Combination Unit can rip to the center of a four foot panel, and has a full 14-in. of table surface in front of the saw blade. Its patented "feather-touch" ball-bearing rip fence can be moved into position with the greatest of ease, thereby doing away with the need for time-taking and cumbersome micrometer adjustment. The extra-sturdy steel cabinet, 33 in. deep and 33 in. wide with a comfortable "working height" of 34 in., reduces vibration, and houses the ⅔-h.p. dust-

Combination Saw-Jointer-Sander

proof, fully enclosed, 60-cycle, one-phase ball-bearing motor.

Additional information may be obtained by writing to the manufacturer.

(For Convenience Circle Index Code 0902)

NEW STANLEY HAMMER — THE STEELMASTER

Stanley Tools division of the Stanley Works have introduced a newly developed all-steel hammer with neoprene grip, called Steelmaster.

Stanley Hammer — the Steelmaster

Perfectly balanced for accurate untiring blows, the Steelmaster has many outstanding features that are exclusive with this hammer; for instance, the *entire* head has been given a precisely controlled heat treatment which results in uniform fine-grain structure of steel from face surface to claw tips. Laboratory tests show the structural composition of the Steelmaster hammer head to be the finest on the market. Produced by induction heat treatment, the tempered rim of the face reduces chipping to a negligible factor.

The completely heat-treated chrome-alloy tubular handle is double-locked in the hammer head by a double-tapered eye, and *will not break*. Contoured to fit the hand comfortably, the neoprene grip is *inseparably bonded* to the handle.

For further information on the Steelmaster write to the manufacturer.

(For Convenience Circle Index Code 0903)

NEW INDUSTRIAL-ARTS BENCHES

E. H. Sheldon Equipment Company have introduced a new industrial arts bench that incorporates a wide range of facilities for teaching a complete curriculum. The unit is called a Total Experience Industrial Arts Work Center. It comprises three individual benches which are integrated into a shop center with six pupil work stations. The entire center is 136 in. long, 54 in. wide, and may be made in any height to meet the needs of various age class groups.

New Industrial-Arts Benches

The individual benches are joined in a staggered V design, permitting ample room at each station for the student to work or study without interference from his neighbor.

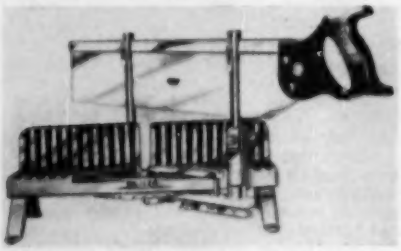
All industrial arts — woodworking, metalworking, electricity, and others — as well as arts and crafts, may be taught at the center. In addition, students may remain at the center for class assembly activities such as demonstrations and visual aids. Books, papers, and student project materials are stored in the base cabinets of the center.

Descriptive literature giving more detailed information on many other interesting features of this unit is obtainable.

(For Convenience Circle Index Code 0904)

NEW LANGDON MITRE BOX

Millers Falls Company announces the new Langdon Mitre Box, Model 1124. Modeled after the Millers Falls Langdon Acme Box, it is similar in basic design, though more compact. In every way it is a precision machine for cutting angles in wood.



New Langdon Mitre Box, Model 1124

It has a rugged, one-piece, cast iron bed and back, with other parts of steel, nickel-plated where exposed. The extendable swinging lever travels freely from 45 deg. to 90 deg., right or left, and locks automatically at frequently used angles.

Maximum capacity is 10½ in. at right angles, 7¼ in. at miter. Length of bed 18 in., width 4⅛ in., height of back 3 in.

More detailed information on Model 1124 is available.

(For Convenience Circle Index Code 0905)

NEW KALAMOBILE CHASSIS

The Machine Tool Division of Kalamazoo Tank and Silo Company have introduced a

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For detailed bulletins write

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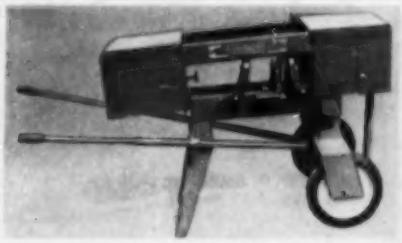
Box 336G • Vincennes, Indiana

labor saver for plumbers, electricians, welders, those in light construction, and anyone else using horizontal metal cutting band saw facilities. It is the new Kalamobile chassis, a mobile carrier for the Model 610 Series metal cutting band saw, manufactured by this company.



Kalamobile Chassis

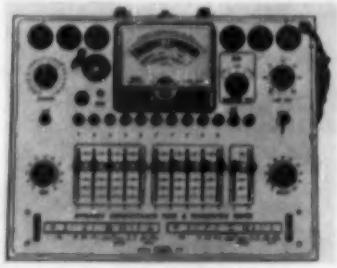
With its rubber-tired 12-in. wheels and telescoping handles, Kalamobile can easily be moved from place to place by one man. The Kalamobile is available in two styles — (1) the Model M610D — dry, and (2) M610W — wet. This chassis is available for mounting any 610 now in service.

Complete details are available upon request.

(For Convenience Circle Index Code 0906)

EICO PRODUCES NEW TESTER

Excellent for color and monochrome TV servicing, the new EICO Dynamic Conductance Tube & Transistor Tester No. 666 features speedy, simple operation, close simulation of actual tube operating conditions, outstanding thoroughness, sensitivity and accuracy of test, ruggedness, and superior electrical and mechanical design. It is manufactured by Electronic Instrument Company.



New EICO Tester

It tests all receiving tubes including subminiatures, special purpose, and the new series-string 600, 450, and 300 ma. types (plus color and monochrome TV picture tubes with accessory adapter). It provides a composite indication of mutual conductance (Gm), plate conductance (Gp), and peak emission. Test accuracy is assured by: simultaneous selection of any one of 4 combinations of 3 plate, 3 screen, and 3 ranges of control grid voltage; grid voltage variable over 3 ranges with 5 per cent accurate wire-wound potentiometer; 5 ranges of meter sensitivity with 1 per cent precision shunts and 5 per cent accurate potentiometer; 200 ua meter.

Additional information is available upon request.

(For Convenience Circle Index Code 0907)

GYRO-VISE MODEL NO 73½

The Columbian Vise & Mfg. Company announce a new gyro-vise model, featuring increased jaw width plus removable and replaceable pipe jaws. Known as No. 73½, the new vise has a jaw width of 3½ in. It marks an increase of 1 in. over previous

(Continued on next page)

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SHOP EQUIPMENT NEWS

(Continued from previous page)

Gyro-Vise Model No. 73½

models. Jaw depth is 2½ in., and jaw-gripping area 7⅞ in. Maximum jaw opening is 5 in. Pipe capacity is ⅛ to 1½ in. Addition of pipe jaws to the gyro-vise assembly is claimed to mark the first time these have been offered in vises of this type.

Another new feature is a 1¾-in. square polished anvil surface.

The gyro-vise operates on a round base on which it can be turned and locked in any desired position. It may be used upright, laid flat on either side, or placed at any required angle.

Vises are 8½ in. high and weigh 16½ lb. Further details available upon request.

(For Convenience Circle Index Code 0908)

NEW DURO 16-IN. JIG SAW

Duro Metal Products Company have introduced for the first time, a jig saw with an unlimited capacity. This new 16-in. jig saw can rip long pieces with ease and convenience. Unique chuck adjusting feature permits the operator to rotate blade in any desired position. This *swing* room increases the utility

Duro 16-in. Jig Saw

of the unit permitting greater latitude in type of work performed. Easy acting foot guide holds work in position securely, and invisible built-in blower keeps sawdust away from the cutting area.

Ruggedly constructed of one-piece cast iron, it is vibration free, rigid, extremely accurate and can cut wood, plastics, and light metal up to 3 in. thick.

Additional information on other unique features of this jig saw is available upon request.

(For Convenience Circle Index Code 0909)

NEW WHEEL ALIGNMENT SET

Snap-on Tools Corporation have produced a complete Wheel Alignment Tool Set and display stand, with which a mechanic can do

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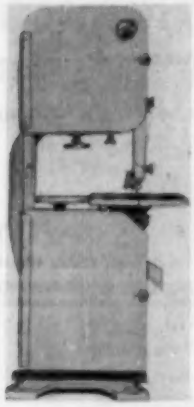
More complete information is available.

(For Convenience Circle Index Code 0910)

NEW NORTHFIELD BAND SAWS

The Northfield Foundry & Machine Company have completely redesigned their Band Saw Line. The new models feature modern, streamlined appearance and mechanical refinements. They are offered in 20-in., 27-in., 32-in., and 36-in., sizes. Belt driven models are available for sawing fabrics, plastics, and metals, in addition to wood. Proper speeds are provided through the use of various size pulleys. Manual starters are furnished on the 20-in. band saw. Magnetic starters and push button stations on all others.



Northfield Band Saw

Frames are heavy duty, fully cored one-piece castings of high strength cast iron with wide ribbed feet to insure against vibration. Rockers are the machined hand babbitt bearing type, providing the best anti-friction combination, for ease of adjustment, and for natural resistance to corrosion. Long, rigid, heavy duty quills use the best spindle steel available to provide high speed accuracy. Quills and motors use sealed-for-life precision ball bearings.

(For Convenience Circle Index Code 0911)

JOHNSON GAS FORGE FURNACE

The Johnson Gas Appliance Company have designed and manufactured a new gas fired forge furnace. It is listed by Johnson as Model No. 133 and is intended for use in blacksmith shops, agricultural and vocational shops, and machine shops.

The forge provides the high, fast heat needed for sharpening and forging parts and tools. It burns all types of gas and is

(Continued on next page)

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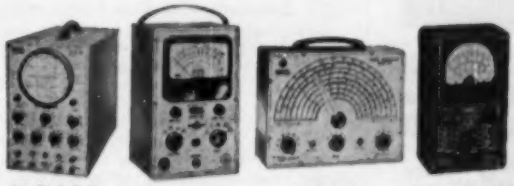

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SHOP EQUIPMENT NEWS

(Continued from previous page)

Johnson 133 Gas Furnace

equipped with four burners with separate shut-off valves on end burners. The forge is rated at 370,000 maximum B.T.U. input per hour.

The body of the new Johnson Forge is heavy steel. The firebox is heavily insulated and measures 5½ in. wide, 7½ in. deep, and 27 in. long. All wearing surfaces are of hard firebrick. The refractory lid is mounted on a pivot pole and is adjustable. The forge furnace is 30 in. high over all, and 40 in. long. Its shipping weight is listed at 570 lb.

For more information write to the manufacturer.

(For Convenience Circle Index Code 0912)

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DIAL INDICATOR SET NO. 253

The L. S. Starrett Company provides in one handy, compact kit, a complete range of dial indicators which will economically handle most gauging jobs. The set of three is designed for tool and die shops, machine shops, and inspection departments which have frequent use for dial indicators but where a heavy investment is not justified.

Furnished in a handsome mahogany case, the set contains three Starrett High Precision-Low Friction Dial Indicators; a No. 25-111 indicator graduated .0001 in., reading 0-5-0, range .025 in.; a No. 25-131 indicator graduated .0005 in., reading 0-25-0, range .125 in.; and a No. 25-441 indicator graduated .001 in., reading 0-100, range 1.000 in.

These three indicators are representative of the complete new line of Starrett High Precision-Low Friction Dial Indicators which feature simplified construction, easy-reading dials, no-glare Satin Chrome Finish on case. The complete line includes 140 models to meet every requirement.

(For Convenience Circle Index Code 0913)

Starrett Dial Indicator Set No. 253

Descriptive Material

NIAGARA BULLETINS 65C AND 77E

Niagara Machine & Tool Works offers a new bulletin No. 65C on their complete line of gap frame double crank presses. It contains detailed information and specifications for each of the models, and is well illustrated.

Bulletin No. 77E covers their slip roll forming machines — power and hand operated. These machines are extremely versatile and highly productive.

For more complete information write to the company.

(For Convenience Circle Index Code 0914)

JOHNSON RELEASES NEW CATALOG

The Johnson Gas Appliance Company has published a new catalog of their products. It pictures and describes Johnson's line of furnaces, burners, valves, torches, mixers, blowers, stock tank heaters, and controls. Complete specifications and shipping weights are listed for each item.

Two new Johnson products are included in the catalog — the Johnson Water Warmer, Model CWS5; and a new Forge Furnace, No. 133.

Catalog is available upon request.

(For Convenience Circle Index Code 0915)

WILTON TOOL CATALOG

Wilton Tool Manufacturing Company has published a special supplement to its general catalog, giving complete information on selected company products that are especially applicable in school shops. Of special interest is new information on Wilton's Rapid Titan Woodworkers Vises and C-Clamps, which combine free sliding action with continuous screw tightening, and come equipped with a nut said to be practically wear-proof. Teachers and students alike will find the new catalog supplement a valuable clamping tool reference guide, and it will be of special interest to those who are planning to expand or upgrade the equipment in their shops.

Catalog may be obtained by writing for one.

(For Convenience Circle Index Code 0916)

DURO POWER TOOLS CATALOG

Duro Metal Products Company have issued their new Catalog No. WW56 which describes and illustrates their complete line of power tools and equipment, including accessories for the drill press, lathe, and router and shaper, and accessories for sanding, buffing, polishing, grinding, and drilling.

Also available is their price list No. C-113 recently issued.

For your copy write to the company.

(For Convenience Circle Index Code 0917)

SAX BROTHERS CRAFTS CATALOG

Sax Brothers, Inc., have made available their new No. 17 All-Crafts Catalog. An enlargement over their former catalog, this edition is comprised of 76 large pages. Crafts covered include: leatherwork, metal enameling, metal crafts, ceramics, lapidary, woodenware, and numerous miscellaneous crafts such as

(Continued on next page)

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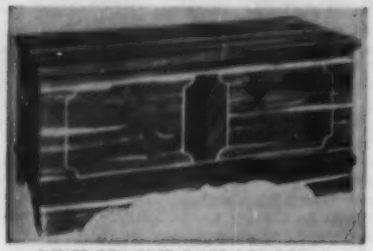

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(Continued from previous page)

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Business and Personal News

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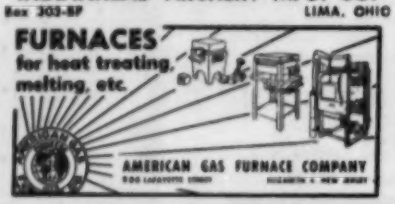

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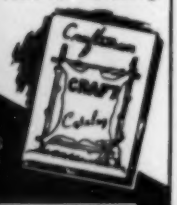

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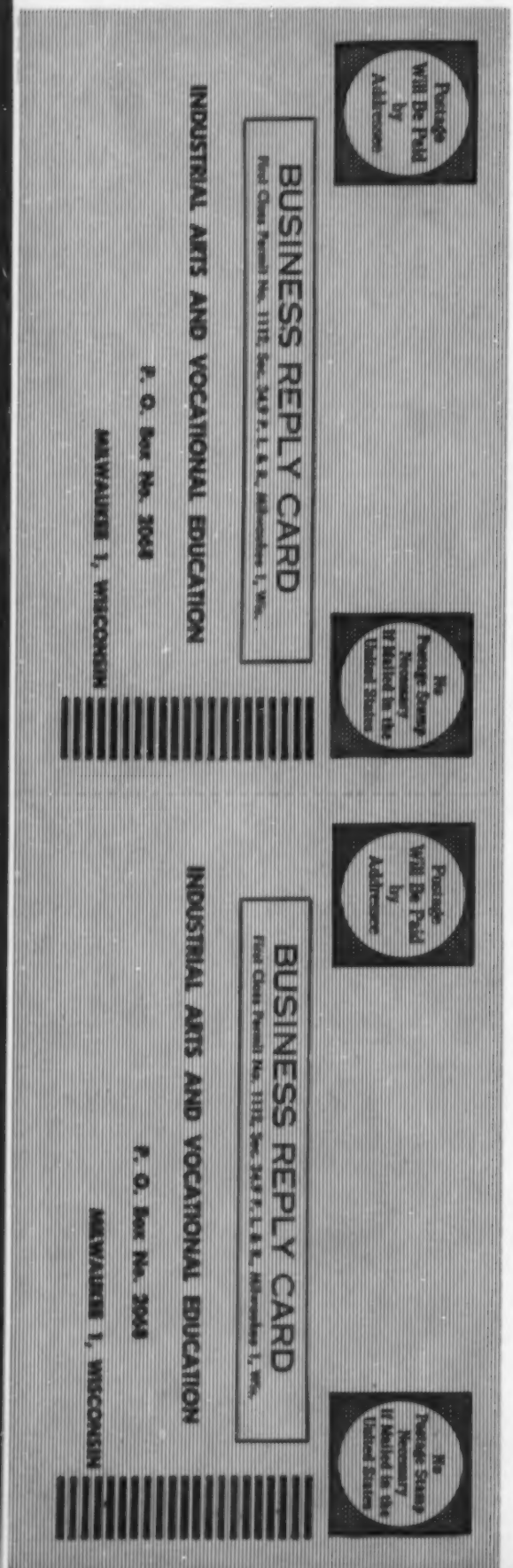
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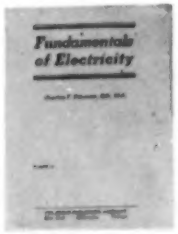

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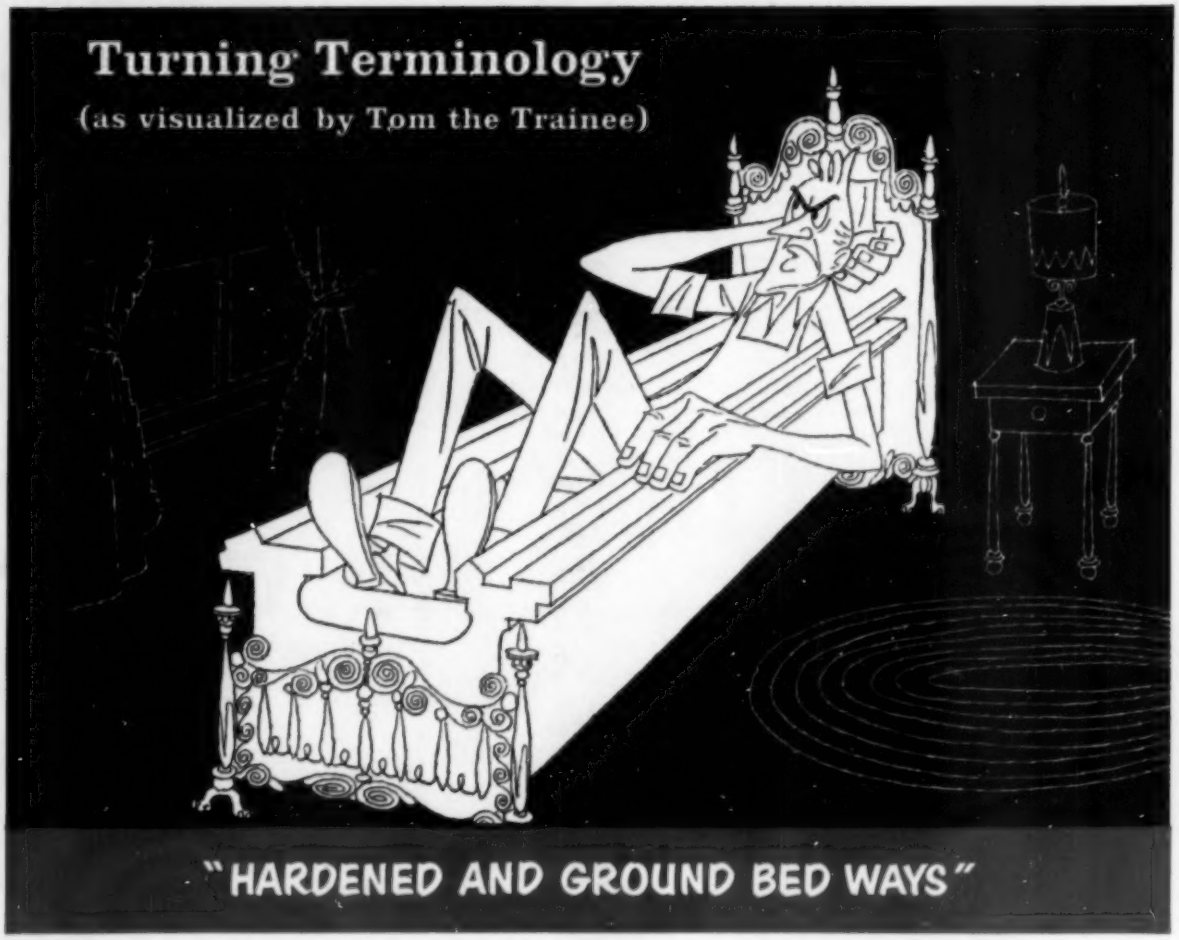

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